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/Kathryn Marley/

Kathryn Marley

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of inventor(s):

Lukas van Ginneken et al.

Application No. **10/828,547**

Confirmation No. **3884**

Filing Date: **19 April 2004**

Title: **Timing Closure Methodology**

Group Art Unit: **2825**

Examiner: **Vuthe Siek**

CUSTOMER NO. 36454

MAIL STOP AMENDMENT

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

DISCLOSURE CONCERNING RELATED LITIGATION

Sir:

Submitted herewith please find an Order from litigation related to the present application:

- (1) Memorandum of Decision: Findings of Fact and Conclusions of Law Re: Patent Ownership in *Synopsys Inc. v. Magma Design Automation, Inc. In the U.S. District Court for the Northern District of California, C-04-3923*.
- (2) Stipulation and Order Re: Dismissal in *Synopsys Inc. v. Magma Design Automation, Inc. In the U.S. District Court for the Northern District of California, C-04-3923*.

The Commissioner is hereby authorized to charge any fees determined to be due in connection with this communication to our Deposit Account No. 50-0869 (SYNP 1006-0).

Respectfully submitted,

Dated: 03 November 2008

/ Mark. A. Haynes /

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IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF CALIFORNIA

SYNOPSYS, INC.,

No. C-04-3923 MMC

Plaintiff,

**MEMORANDUM OF DECISION;
FINDINGS OF FACT AND
CONCLUSIONS OF LAW RE: PATENT
OWNERSHIP**

v.

MAGMA DESIGN AUTOMATION, INC.,

Defendant.

On September 17, 2004, plaintiff Synopsys, Inc. ("Synopsys") filed the above-titled action for patent infringement against defendant Magma Design Automation, Inc. ("Magma"). Pursuant to stipulation of the parties, trial was bifurcated, and the bifurcated issues were tried to the Court from April 24, 2006 through May 10, 2006.

Pursuant to stipulation, (see Docket Nos. 986, 990, 1024), the trial encompassed the following issues: (1) ownership of United States Patents Nos. 6,453,446 ("446 patent), 6,725,438 ("438 patent), and 6,378,114 ("114 patent"), as well as any continuations or foreign counterparts of said patents; (2) Magma's Second, Fourth, Sixth, and Tenth Counterclaims; and (3) Magma's Seventh Affirmative Defense. Pursuant to its Second, Sixth, and Tenth counterclaims, Magma seeks a declaratory judgment that IBM is a joint owner of, respectively, the '114, '446, and '438 patents. (See Magma's Answer to Third Amended Complaint ("TAC Answer"), filed September 2, 2005, ¶¶ 206-210, 227-231, 246-

250.) Pursuant to the Fourth Counterclaim, Magma seeks a declaratory judgment that Magma is a co-owner of the '446 and '438 patents. (See id. ¶¶ 216-221.) Magma's Seventh Affirmative Defense is that the '446 and '438 patents were not assigned to Synopsys pursuant to the Proprietary Information and Inventions Agreement between Lukas van Ginneken ("van Ginneken") and Synopsys or, in the alternative, that only a partial interest in said patents was assigned to Synopsys and that a partial interest is also held by Magma and/or IBM. (See id. ¶¶ 151-153.)

On June 9, 2006, the parties filed simultaneous post-trial memoranda and proposed findings of fact and conclusions of law. On June 30, 2006, the parties filed simultaneous reply post-trial memoranda.

Having fully considered the evidence submitted, the papers filed in support of and in opposition to the parties' respective positions, and the arguments of counsel, the Court by this memorandum of decision issues its findings of fact and conclusions of law, pursuant to Rule 52(a) of the Federal Rules of Civil Procedure.

FINDINGS OF FACT

A. THE PATENTS

1. The '446 patent, titled "Timing Closure Methodology," provides on its face that van Ginneken is the sole inventor, and that Magma is the assignee. (See Ex. 3 at 1.)

2. The '438 patent, also titled "Timing Closure Methodology," provides on its face that van Ginneken is the sole inventor, and that Magma is the assignee. (See Ex. 1 at 1.)

3. The '114 patent, titled "Method for the Physical Placement of an Integrated Circuit Adaptive to Netlist Changes," provides on its face that van Ginneken and Narendra V. Shenoy ("Shenoy") are co-inventors, and that Synopsys is the assignee. (See Ex. 5 at 1.)

B. ELECTRONIC DESIGN AUTOMATION

4. Electronic Design Automation ("EDA") companies such as Magma and Synopsys develop computer programs that are used to design integrated circuits ("ICs" or

1 "chips"). The building blocks of a chip are logic cells ("gates" or "cells"), each of which
2 carries out some basic logical function.

3 5. Determining where to place the cells on the chip such that the cells (1) fit
4 within the boundaries of the chip and (2) meet the prescribed timing constraints is an
5 extraordinarily difficult problem. Complex chips can comprise millions of cells.

6 6. EDA software provides a solution to this problem. EDA software is an
7 automated means of placing and routing the cells. In a process known as logic synthesis
8 (or simply "synthesis"), IC designers use EDA software to translate high level descriptions
9 of an IC into the components that will be fabricated on the chip. In a process known as
10 physical design, IC designers use EDA software to create a detailed physical layout of the
11 chip, precisely locating within the chip's boundary each of the components and the wires
12 that interconnect them.

13 7. A cell is made up of transistors that are designed to perform a logical function,
14 such as comparing two signals and producing a result. The simplest cell is called an
15 "inverter," or a "NOT" cell. It takes one binary digit (1 or 0) as input and produces its
16 opposite (0 or 1, respectively) as output. 0 represents no electrical flow, and 1 represents
17 electrical flow.

18 8. Cells are connected with other cells to form ICs. Once the cells are placed
19 and interconnected, each cell performs its specified function (such as inverting the signal)
20 and communicates the result to the next cell. The time that it takes for a cell to carry out its
21 function and communicate the result to the next cell is referred to as delay. Delay is
22 affected by (1) the size of the cell and (2) the load placed on the cell, i.e., the amount of
23 effort the cell must exert to communicate its result to the next cell. A larger cell can exert
24 more driving power than a smaller cell, and more power results in a shorter delay for a
25 given load. A longer wire places a greater load on the cell because more effort is required
26 to communicate a result through that longer wire to the next cell. A greater load thus
27 causes a greater delay for a given size cell. Larger cells consume more power and area,
28 however, and thus may be undesirable.

1 9. During the design process, cells are typically selected from a cell library
2 during synthesis. The cell selection may be informed by the overall timing constraints for
3 the chip. Thus, the EDA software will estimate the timing goals for a particular path of cells
4 and select the cells to meet those goals. The output of synthesis is a data file, known as a
5 "netlist," describing the cells and their interconnections.

6 10. During the design process, however, the cell loads will change as changes
7 are made in the physical design. As cells are spaced apart, for example, the length of the
8 interconnecting wires may increase, thereby increasing the load on the cell. As the load on
9 the cell is increased during the design process, the delay for the cell also increases. This
10 requires the EDA software to iterate between logic synthesis and physical design; as
11 changes are made that alter the cell delay, the designer must repeat the synthesis process
12 to select larger or smaller cells.

13 **C. THE SYNOPSYS AND IBM ALLIANCE: JOINT DEVELOPMENT**
14 **AGREEMENT**

15 11. IBM and Synopsys entered into a Joint Development and License Agreement
16 Concerning EDA Software and Related Intellectual Property ("JDA") to develop advanced,
17 commercially viable, EDA software tools for designing and testing integrated circuits
18 comprising more than one million logic gates. (See Trial Exhibit (hereafter "Ex.") 1120
19 § 2.2.)

20 12. Pursuant to its provisions, the JDA became effective January 1, 1996. (See
21 Ex. 1120 at 1.) Synopsys executed the JDA on February 1, 1996, and IBM executed it on
22 February 20, 1996. (See Ex. 1120 at 39.)

23 13. The JDA addresses the proposed development of several "Joint Products"
24 and a "Next Generation Synthesis System" ("NGSS"). (See Ex. 1120 ¶¶ 1.26, 1.32, 2.1.)

25 14. The JDA identifies the following Joint Products: Design Planner, Static
26 Timing, Test, and, as of two years after the effective date of the JDA, CLTA. (See Ex. 1120
27 § 1.26.) Design Planner, Static Timing, Test and CLTA are EDA software tools. (See id.;
28

1 Trial Transcript (hereafter "Tr.") 1016:11-1017:17, 1019:4-6 (Camposano).¹

2 15. NGSS is defined as "an EDA synthesis software product that performs logic
3 synthesis, that is owned by Synopsys and that is based on Design Compiler or Enhanced
4 Design Compiler and BooleDozer." (See Ex. 1120 § 1.31.) NGSS "shall perform both
5 high-end (microprocessor) and mainstream (ASIC) logic synthesis." (See id.)

6 16. IBM and Synopsys anticipated that their product development activities would
7 result in the creation of inventions. (See Ex. 1120 § 4.1.2.1.)

8 17. The JDA distinguishes inventions developed solely by one party from
9 inventions that resulted from the parties' collaborative efforts. (See Ex. 1120 § 4.1.2.1.)
10 The JDA defines "Invention" as "any discovery or improvement, conceived or first reduced
11 to practice during the term of this Agreement in the performance of this Agreement, solely
12 or jointly by one or more employees of Synopsys, or solely or jointly by one or more
13 employees of IBM." (See Ex. 1120 § 1.24.) A "Joint Invention" is "an Invention conceived
14 or first reduced to practice by one or more employees of one party jointly with one or more
15 employees of the other party." (See Ex. 1120 § 1.25.)

16 18. The JDA also distinguishes between ownership of the products under
17 development and ownership of any Inventions and Joint Inventions arising from IBM's and
18 Synopsys's joint product development activities. (See Ex. 1120 § 4.0 et seq.)

19 19. Section 4.1 of the JDA governs the "ownership of the intellectual property of
20 each party relevant to the [JDA]." (See Ex. 1120 § 4.1.)

21 20. The JDA divides intellectual property into two categories: intellectual property
22 created outside the JDA's product development activities, (see Ex. 1120 § 4.1.1), and
23 intellectual property created in furtherance of the JDA's product development activities,
24 (see Ex. 1120 § 4.1.2.)

25 21. Section 4.1.1 addresses ownership of intellectual property created outside the
26 product development activities of the JDA. It provides, "Each party shall retain full

27
28 ¹ The identity of the testifying witness is included in a parenthetical notation following
the citation to the trial transcript.

1 ownership rights to its pre-existing intellectual property or independently developed
2 intellectual property (i.e. intellectual property developed separate from the product
3 development activities of this Agreement) that is incorporated into Joint Product
4 Information, NGSS Information or Enhanced Design Compiler." (See Ex. 1120 § 4.1.1.)

5 22. Under § 4.1.1, pre-existing or independently developed intellectual property is
6 solely owned by the party who created it, even if that intellectual property is incorporated
7 into the parties' joint work product. (See id.)

8 23. The parties agreed to license to each other certain specified
9 separately-created intellectual property for use in developing, marketing, and supporting
10 the Joint Products and NGSS. (See Ex. 1120 §§ 4.2 through 4.4.)

11 24. Section 4.1.2 of the JDA addresses the ownership of Inventions created in
12 furtherance of the JDA's product development activities, and the ownership of resulting
13 EDA tools. Accordingly, it carries the preamble, "As to the Joint Products and NGSS."
14 (See Ex. 1120 § 4.1.2.)

15 25. Section 4.1.2.1 addresses ownership of Inventions created both individually
16 and jointly in the performance of the JDA's product development activities:

17 Any Invention made by one party shall be owned by that party, subject to the
18 patent license granted to the other party elsewhere in this Section 4.0. Any
19 Joint Invention shall be jointly owned, title to all patents thereon shall be joint,
20 all expenses incurred in obtaining and maintaining such patents, except as
provided hereinafter, shall be jointly shared, and the parties shall have the
unrestricted right to license. Subsidiaries . . . and third parties thereunder
without accounting.

21 (See Ex. 1120 § 4.1.2.1.)

22 26. Under § 4.1.2.1, IBM and Synopsys co-own any Invention that they jointly
23 conceived or jointly first reduced to practice as part of the product development activities
24 under the JDA. (See Ex. 1120 §§ 4.1.2.1, 1.25.)

25 27. Section 4.1.2.2 addresses the parties' ownership of the Joint Products and
26 NGSS:

27 Other than any Invention or Joint Invention as set forth above, the Joint
28 Products shall be jointly owned by the parties, and NGSS shall be solely
owned by Synopsys . . . To the extent that the Joint Products or NGSS

1 incorporate the pre-existing or independently developed intellectual property
2 of either party as set forth in Section 4.1.1 to this Agreement, such ownership
3 rights for Joint Products or NGSS shall be subject to the rights and licenses
4 granted in this Section 4.0 as to such intellectual property

(See Ex. 1120 § 4.1.2.2.)

5 28. The Joint Products were to be jointly owned by IBM and Synopsys. (See Ex.
6 1120 § 4.1.2.2.)

7 29. NGSS was to be owned by Synopsys. (See Ex. 1120 § 4.1.2.2.)

8 30. The parties' goal was to develop Joint Products and NGSS as "successful
9 commercial products." (See Ex. 1120 § 2.2.)

10 31. Sections 4.1.2.1 and 4.1.2.2 provide that the incorporation of a
11 separately-created Invention or Joint Invention into NGSS or a Joint Product does not
12 change the ownership of the Invention or Joint Invention (which remains owned by the
13 party or parties who created it) or the ownership of the Joint Products. (See Ex. 1120
14 §§ 4.1.2.1, 4.1.2.2.)

15 32. Under § 4.1.1, if a party owns pre-existing intellectual property, or intellectual
16 property developed separately from the JDA's product development activities, the party
17 retains full ownership rights to that intellectual property even if it is incorporated into Joint
18 Product Information, NGSS Information, or Enhanced Design Compiler. (See Ex. 1120
19 § 4.1.1.)

20 33. "NGSS Information," is "Information generated by the Joint Development
21 Team relating to any specific result of the parties' partial or completed development work,
22 relating to NGSS," including but "not limited to, any tool specification, design Information,
23 Code, Documentation, specification, or quality or reliability Information for any NGSS."
24 (See Ex. 1120 § 1.32.) "Information" includes "information in visual, oral, written or other
25 tangible form" that the parties may disclose to one another, or that may be created by one
26 or both parties, during the term of the JDA. (See Ex. 1120 § 1.23.)

27 34. The JDA grants each party a license to use NGSS information for specified
28 purposes. (See Ex. 1120 §§ 4.4, 4.5.)

1 35. Under § 4.1.2.2, if Joint Products or NGSS incorporate pre-existing or
2 independently developed intellectual property, ownership rights to that intellectual property
3 are subject to the rights and licenses granted elsewhere in § 4.0. (See Ex. 1120 § 4.1.2.2.)

4 36. On December 22, 1998, Synopsys and IBM entered into a Dissolution
5 Agreement, which dissolved the JDA, effective January 1, 1999. (See Ex. 1120 at
6 IBM000093.)

7 37. Pursuant to the Dissolution Agreement, any provision of the JDA "not
8 expressly included in or expressly amended by" the Dissolution Agreement is to have no
9 force or effect after the Dissolution Date, and any JDA "provisions amended [t]herein will
10 have force and effect as amended." (See Ex. 1120 at IBM000094.) Section 4 of the JDA,
11 which includes the provisions relating to ownership of intellectual property, was expressly
12 incorporated into the Dissolution Agreement, and remains in effect. (See Ex. 1120 at
13 IBM000098.)

14 38. Section 13 of the Dissolution Agreement obligates IBM to inform its
15 employees "of the restrictions on IBM's use of Joint Product Information and NGSS
16 Information" acquired during the term of the JDA. (See Ex. 1120 at IBM000108.) Section
17 13 governs only the method by which IBM was to notify its employees as to how IBM may
18 use information, including NGSS Information, acquired or created during work under the
19 JDA.

20 **D. THE CONSTANT DELAY PARADIGM**

21 39. At the 1995 International Conference on Computer-Aided Design ("ICCAD"),
22 Joel Grodstein ("Grodstein"), Eric Lehman ("Lehman"), and other researchers from Digital
23 Equipment Corporation ("DEC"), presented papers that proposed an approach for
24 designing ICs, known as "constant delay." Under constant delay, the delay of a cell is
25 maintained as constant during the IC design process and the size of the cell is varied.
26 Constant delay is thus a "size-independent" method of designing ICs. (See Ex. 1095; Ex.
27 1096.)

28 40. The two papers proposing the constant delay approach were Grodstein,

1 Lehman, et al., "A Delay Model for Logic Synthesis of Continuously-Sized Networks," (see
2 Ex. 1095), and a companion paper, Lehman, Grodstein, et al., "Logic Decomposition
3 During Technology Mapping," (see Ex. 1096).

4 41. Under Grodstein's constant delay paradigm, delay would be held constant
5 and cell size would vary as a linear function of the cell's output load. (See Ex. 1095; Tr.
6 1107:10-1108:2 (Friedman).)

7 42. Grodstein assumed continuous sizing of cells, whereby the cell library would
8 include logic cells of whatever sizes were necessary to satisfy the delay constraints set for
9 the IC. (See Ex. 1095.)

10 43. Grodstein's work also disclosed a method for setting an initial intended delay,
11 known as the "Power x Delay" method, and provided experimental results using actual
12 circuit designs. (See Ex. 1095; Tr. 1110:1-1111:12 (Friedman).)

13 44. Under the Power x Delay method, target delays are set by minimizing the
14 product of Power times Delay. Minimizing this product is equivalent to maximizing
15 "efficiency." (See Ex. 1095.)

16 45. By maximizing "efficiency," the Power x Delay method sets the target delay by
17 determining the lowest delay achievable for the least amount of power that still meets the
18 desired timing constraints for the IC. (See Ex. 1095.)

19 46. Grodstein's method of Power x Delay does not set delays based on gain
20 (output capacitance divided by input capacitance). (See Ex. 1095; Tr. 1112:8-1113:25
21 (Friedman), 1170:16-1172:7 (Sarrafzadeh).)²

22 **E. THE INVENTIONS: '446 AND '438 PATENTS**

23 47. The specifications of the '446 and '438 Patents state: "According to the
24 invention, the gate [i.e., cell] size is adjusted after cell placement based on changes in the
25 capacitive load in order to maintain D [i.e., delay] as 'constant,'" (See Ex. 3 at
26 6:48-51; Ex. 1 at 6:49-52.)

27 ² The parties refer to the use of gain to set initial intended delays as "gain-based
28 synthesis."

1 48. Every claim of the '446 and '438 Patents requires an "initial intended delay" or
2 a "relative delay value." (See Ex. 3 at 17:14-22:28; Ex. 1 at 17:18-18:53.)

3 49. As construed by the Court, "initial intended delay" and "relative delay value"
4 both mean a "delay set as a target," which is held constant unless it is revised at some
5 point in the design process. (See Docket No. 392 at 32:8, 32:13, 10:1-10.)

6 50. The claims of the '446 and '438 Patents require a method to set the target
7 delay and thereafter to calculate changes to the delay caused by changes in the load,
8 which, in turn, will be accommodated by adjustments in cell size to maintain constant delay.
9 These methods must be independent of cell size (which will vary during the process) and
10 they must work in an automated system for designing ICs using arbitrary cells, as further
11 required by the claims. (See Ex. 3; Ex. 1.)

12 **F. IBM AND SYNOPSYS'S PREPARATION FOR JOINT ALLIANCE**
13 **PROJECTS**

14 51. In late 1995 and early 1996, IBM and Synopsys began preparing for the joint
15 alliance work under the JDA.

16 52. Early in 1996, IBM and Synopsys began exploring possible EDA design
17 methodologies, including logic synthesis techniques that would form the foundation of
18 NGSS. (See Ex. 1123.)

19 53. Van Ginneken was assigned by Synopsys to work on constant delay as part
20 of the NGSS project with IBM. (See Ex. 1136 at SY000045.)

21 54. Van Ginneken, who had attended Grodstein's presentation at the 1995
22 ICCAD, proposed that IBM and Synopsys pursue the constant delay concepts presented by
23 Grodstein as a possible basis for NGSS. (See Ex. 1123.)

24 55. During a "meeting on NGSS" at Synopsys on January 30, 1996, and during a
25 subsequent NGSS meeting on February 28, 1996, van Ginneken presented the constant
26 delay concepts disclosed in Grodstein. (See Ex. 1123; Ex. 128 at SY008567.)

27 56. Although these two meetings were not attended by anyone from IBM, van
28 Ginneken understood that these meetings were part of the "joint project with IBM" pursuant

1 to the JDA, and were held in anticipation of the joint IBM-Synopsys team's pursuit of EDA
2 research. (See Ex. 1123; Ex. 128; Ex. 1661 (van Ginneken Decl.) ¶¶ 2-3.)

3 57. All of the work that van Ginneken performed at Synopsys relating to the
4 constant delay paradigm and gain-based synthesis was part of the "joint project with IBM"
5 under the JDA. (See Ex. 1661 ¶ 2; van Ginneken Dep. 92:16-21.)

6 58. The notes of the January 30, 1996 meeting contain only one reference to
7 constant delay: "LVG/RR [Lukas van Ginneken/Richard Rudell]: Discussion on constant
8 delay model." (See Ex. 1123 at SY013051.)

9 59. As of the end of January 1996, van Ginneken's ideas about constant delay
10 came solely from the Grodstein and Lehman papers. (See Ex. 1123; Tr. 830:21-831:5
11 (Damiano).)

12 60. At the February 28, 1996 meeting, van Ginneken made another presentation
13 on Grodstein's constant delay paradigm. (See Ex. 128 at SY008567; Tr. 937:4-21, 976:4-
14 977:4 (Shenoy).)

15 61. There was no discussion of gain-based synthesis or the theory of logical effort
16 during the February 28 meeting. (See Ex. 128 at SY008567; Tr. 937:22-938:7, 976:4-977:4
17 (Shenoy).) As discussed below, IBM engineer Prabhakar Kudva ("Kudva") introduced van
18 Ginneken to the theory of logical effort after Kudva began working with van Ginneken in
19 March 1996.

20 62. Shenoy of Synopsys attended the February 28 meeting and took handwritten
21 notes. (See Ex. 128 at SY008567.) The notes indicate who attended the meeting, but do
22 not list Synopsys's Richard Rudell ("Rudell") among the attendees. (See id.) The notes do
23 not reflect any discussion of gain-based synthesis or the theory of logical effort.

24 63. Shenoy's notes reveal that van Ginneken, as he had done during the January
25 30 meeting, merely reiterated the constant delay concepts found in Grodstein. (See Ex.
26 128.)

27 64. Van Ginneken presented the Power.x Delay method of setting target delays
28 set forth in Grodstein; Shenoy's notes contain a graph including the curved line of the

1 Power x Delay method. (See Ex. 128 SY008567; Tr. 976:11-977:4 (Shenoy); Ex. 1095 at
2 460, Fig. 4; Tr. 566:2-567:19 (Harris).).

3 65. Shenoy's notes do not contain a graph for gain-based delays, which would
4 show a straight-line relationship because delay is linearly related to gain. (See Tr.
5 976:11-22 (Shenoy).) The February 28, 1996 meeting was the first time Shenoy was
6 exposed to the general concept of constant delay. (See Tr. 969:11-15 (Shenoy).)

7 66. Van Ginneken did not use the word "gain" during the February 28, 1996
8 NGSS meeting. (See Tr. 834:13-836:24 (Damiano).)

9 **G. VAN GINNEKEN'S RESEARCH AS OF FEBRUARY 29, 1996**

10 67. On April 25, 1996, van Ginneken prepared an Invention Disclosure Form at
11 Synopsys's request. (See Ex. 1152.) The Invention Disclosure Form, titled "Constant
12 Delay Synthesis," states van Ginneken "conceived the idea" on February 29, 1996, which
13 was before van Ginneken's collaboration with Kudva. (See Ex. 1152.) The Invention
14 Disclosure Form further provides: "Constant delay synthesis is an entirely different
15 paradigm for delay optimization in logic synthesis. It promises to radically simplify the
16 design process from behavior synthesis down to physical desi[gn]. It is probably more of a
17 philosophy th[an] an algorithm. . . . A major problem is that much of the basic idea can be
18 found in two papers [the Grodstein work] published in the ICCAD of 95. However the
19 scope of application of constant delay reaches far and wide, and we could patent many
20 applications." (See Ex. 1152.)

21 68. The Invention Disclosure Form does not identify any method for setting target
22 delays. It does not mention gain, gain-based synthesis, or initial intended delay. (See Ex.
23 1152; Tr. 606:16-21, 608:17-21 (Harris).)

24 **H. THE EARLY MARCH 1996 IBM AND SYNOPSYS JOINT ALLIANCE**
25 **MEETING**

26 69. In early March 1996, IBM and Synopsys convened a joint alliance planning
27 meeting. (See Tr. 838:3-15 (Damiano).)

28 70. At this meeting, van Ginneken made a slide presentation to IBM titled "Logic

1 Synthesis for Physical Design.” The slide presentation detailed what van Ginneken knew
2 about a number of EDA concepts, including Grodstein's constant delay paradigm. (See Ex.
3 1661 ¶ 4; Ex. 1155.)

4 71. In that presentation, the only slide discussing the selection of delays for
5 isolated cells in a constant delay model was a slide describing Grodstein's Power x Delay
6 method. (See Ex. 1155 at IBM001578.) As of the date of that presentation, van Ginneken
7 had not conceived of an effective method for selecting and optimizing the delays of
8 arbitrary cells, and, accordingly, presented only Grodstein's Power x Delay concept. (See
9 Ex. 1661 ¶ 4; Ex. 1155; Kudva Dep. 200:2-10, 207:25-208:20.)

10 72. Van Ginneken's presentation also contained a slide, titled “Sizing of a Path,”
11 which discussed a method from Grodstein that does not involve the use of gain to calculate
12 delay. (See Ex. 1155 at IBM001573.) This slide contained an equation from Glasser &
13 Dobberpuhl's text book, The Design and Analysis of VLSI Circuits (1985) (“Glasser”), that
14 Grodstein had referenced in his 1995 paper on constant delay. (See Ex. 1155; Ex. 1095;
15 Ex. 1739 at 254.)

16 73. Grodstein cited to Glasser's equivalence 5.2. Grodstein states: “Any delay
17 model must represent the relationship between cell area, load, and delay. A common
18 model has the size of a gate being constant, and the gate's delay then varying linearly with
19 output load. This model is intuitive and is accurate to a first order [9, pg. 254].” (See Ex.
20 1095 (brackets in original).) In Grodstein, reference 9 is Glasser. (See Ex. 1095.)
21 Equivalence 5.2 is at page 254 of Glasser. (See Ex. 1739.)

22 74. Van Ginneken's early March 1996 presentation reproduces and expressly
23 credits Glasser for equivalence 5.2, which appears on van Ginneken's “Sizing of a Path”
24 slide, although van Ginneken incorrectly represents Glasser's equivalence relationship (\equiv)
25 as an equality ($=$). (See Ex. 1155 at IBM001573; Ex. 1739 at 254.)

26 75. Glasser's equivalence 5.2 contains an unknown component, the parameter n_i ,
27 which is called the “fan-out parameter”; Glasser states that the fan-out parameter “has
28 many distinct interpretations, depending on the problem being solved.” (See Ex. 1739 at

1 254.)

2 76. Glasser's use of an equivalence relationship (\equiv) rather than an equality ($=$)
3 suggests that the parameters are being left vague to permit the relationship to be refined
4 further based on later research. (See Tr. 1204:7-20 (Sarrafzadeh).)

5 77. Van Ginneken's presentation of the Glasser equivalence 5.2 does not show a
6 gain-based method for setting delays. To arrive at an equation where delay is based on
7 gain using Glasser, one must perform a mathematical derivation of equivalence 5.2, and
8 there is no evidence that van Ginneken performed this derivation by the time of his early
9 March 1996 presentation. (See Tr. 638:22-639:4 (Harris).) Put another way, "you have to
10 know what you are trying to get at in order to do [that] particular transformation[.]" (See Tr.
11 639:19-22 (Harris); see also Tr. 1202:8-24 (Sarrafzadeh).) Glasser does not teach a
12 method for calculating delay in a size-independent fashion. (See Tr. 1202:25-1203:18
13 (Sarrafzadeh).)

14 78. Van Ginneken was familiar with the work of Mead and Conway, which
15 analyzed gain and delay for a path of inverters. Inverters are a simple type of cell.
16 Although van Ginneken had considered using gain to select the delay for a path of
17 inverters, it was not clear to him how to generalize the use of gain to other types of logic
18 cells. (See van Ginneken Dep. 47:20-48:15; Ex. 1155; Kudva Dep. 203:4-12.)

19 79. Before his collaboration with Kudva, van Ginneken had not determined
20 whether there was any effective method to calculate initial delays for all cells in a circuit
21 design, nor did van Ginneken understand how the theory of logical effort could be used to
22 isolate the constituent elements of cell delay or that gain could be used to implement an
23 effective, size-independent method to calculate the delays of the cells. (See Ex. 1661
24 ¶¶ 4-6; Ex. 1155; Kudva Dep. 37:21-38:25.)

25 **I. KUDVA AND VAN GINNEKEN'S COLLABORATION ON RESEARCHING**
26 **AND DEVELOPING CONSTANT DELAY AND GAIN-BASED SYNTHESIS**

27 80. Shortly after van Ginneken's presentation to IBM, Kudva was assigned to
28 work with van Ginneken on the constant delay paradigm as part of the NGSS project. (See

1 Ex. 1661 ¶¶ 5-7; van Ginneken Dep. 47:14-48:18, 131:6-132:20; Kudva Dep. 26:12-21,
2 35:8-17.)

3 81. Within a week of Kudva's assignment, Kudva and van Ginneken discussed
4 the constant delay research as part of the NGSS project. (See van Ginneken Dep.
5 130:6-132:20; Kudva Dep. 26:12-27:12, 214:7-13.)

6 82. Van Ginneken informed Kudva that he "was looking for a way to assign initial
7 constant delay" because he had not determined a method for selecting the delays of
8 individual cells required by the constant delay approach, other than the Power x Delay
9 method already taught by Grodstein. (See Kudva Dep. 37:25-38:25; van Ginneken Dep.
10 45:4-20, 48:7-22, 131:6-132:20.)

11 83. After considering the problem posed by van Ginneken, Kudva recognized that
12 the 1991 paper by Sutherland & Sproull titled "Logical Effort: Designing for Speed on the
13 Back of an Envelope" ("Sutherland") provided the answer that had eluded van Ginneken to
14 date. (See Ex. 1085; van Ginneken Dep. 131:21-132:20; Kudva Dep. 37:25-39:25.)

15 84. After Kudva sent the Sutherland paper to van Ginneken, Kudva and van
16 Ginneken had "extensive" discussions, during which Kudva "told [van Ginneken] that this
17 [Sutherland] paper has a way of getting fixed gain values that is optimal." (See Kudva Dep.
18 39:11-16; van Ginneken Dep. 46:7-19.)

19 85. Kudva "appreciated the potential application of Sutherland's theory of logical
20 effort to the constant delay paradigm," and "recognized that gain-based analysis could be
21 applied to the constant delay paradigm and thus contributed to the concept of gain-based
22 synthesis." (See Ex. 1661 ¶ 6.) The theory of logical effort articulated a delay model that
23 provided a method for setting the target delay of arbitrary gates, regardless of the type of
24 cell or the complexity of the integrated circuit. (See van Ginneken Dep. 42:22-45:20,
25 45:24-48:22, 54:1-5, 56:17-57:4, 185:1-22, 308:9-17; Kudva Dep. 26:22-27:12, 31:7-24,
26 38:18-25, 39:11-16, 200:15-19, 205:11-206:6.) The theory of logical effort also provided a
27 method of measuring, i.e., modeling, delays in a size-independent fashion. (See Kudva
28 Dep. 29:23-31:24, 205:11-206:6.)

1 86. Kudva introduced van Ginneken to the idea of using gain to assign initial
2 constant delay.³ (See Kudva Dep. 38:18-25; van Ginneken Dep. 45:4-20; Ex. 1661 ¶ 6.)

3 87. Unlike Grodstein's Power x Delay concept, the theory of logical effort
4 separately analyzed the various components of delay, including electrical effort, i.e., gain,
5 and logical effort. (See Kudva Dep. 16:7-17:22; Ex. 1155.) Kudva and van Ginneken
6 demonstrated that Power x Delay was not a useful method for setting target delays
7 because, among other reasons, it would lead to a gain of one for an inverter, a result that
8 makes no sense. (See Tr. 1171:10-1172:7, 1175:13-1176:14 (Sarrafzadeh); Ex. 1195 at
9 SY012226.)

10 88. The application of the theory of logical effort to the constant delay paradigm
11 resulted in van Ginneken's and Kudva's joint work in gain-based synthesis, specifically, the
12 application of gain-based modeling of cell delays to the constant delay paradigm. (See Ex.
13 1661 ¶ 6.)

14 89. Kudva made a crucial contribution to the gain-based synthesis inventions by
15 discovering the "key insight to use a 'gain' based sizing strategy"; this insight "suddenly
16 opened up a much wider field of application for CD [constant delay], and [made] it feasible
17 to build a synthesis system around this strategy." (See Ex. 1293 at IBM005431; van
18 Ginneken Dep. 46:7-47:3, 47:14-19, 56:17-57:4, 185:9-187:12, 308:9-17; Kudva Dep.
19 29:23-31:24, 39:11-16; Stok Dep. 114:18-115:8.)

20 90. Kudva saw the relationship between the constant delay model and the work
21 of Sutherland and Sproull. He made that connection, and he sent van Ginneken a paper to
22 alert him to that connection. (See van Ginneken Dep. 46:7-15.)

23 91. Van Ginneken and Kudva had extensive discussions about this connection.
24

25 ³ The Court is unpersuaded by testimony from Synopsys's Robert Damiano
26 ("Damiano"), Rudell, and Shenoy that van Ginneken discussed the use of gain to determine
27 delay at meetings prior to the beginning of Kudva's collaboration, in March 1996, with van
28 Ginneken. (See, e.g., Tr. 723:13-725:5 (Damiano), 887:7-888:17 (Rudell), 935:12-20
(Shenoy).) In light of the absence of references to such use of gain in Shenoy's notes of
such meetings and in the minutes thereof, as well as the absence of any such reference in
van Ginneken's invention disclosure, the Court finds Damiano, Rudell and Shenoy are
mistaken as to the timing and/or content of any such discussions.

1 (See van Ginneken Dep. 46:16-19.)

2 92. Between March and May 1996, Kudva and van Ginneken collaborated on the
3 development of software and a prototype to evaluate the effectiveness of gain-based
4 synthesis. (See Ex. 1661 ¶ 7.)

5 93. On April 2, 1996, at an IBM-Synopsys joint alliance meeting, Kudva and van
6 Ginneken were assigned to co-author a white paper setting forth their research and
7 discoveries on constant delay. (See Ex. 1143 at IBM004351.)

8 **J. VAN GINNEKEN AND KUDVA'S CO-AUTHORSHIP OF THE WHITE**
9 **PAPER**

10 94. As instructed, van Ginneken and Kudva co-authored a detailed white paper
11 on their joint work, titled "The Constant Delay Methodology" ("White Paper"). (See Ex.
12 1163; van Ginneken Dep. 140:10-14; Kudva Dep. 33:7-22.)

13 95. To draft the White Paper, van Ginneken and Kudva engaged in an "iterative
14 process" and exchanged multiple drafts. They commented on and made changes to each
15 other's work. (See Kudva Dep. 36:7-11; 40:14-41:1, 50:8-22, 51:3-52:11; van Ginneken
16 Dep. 140:10-23.)

17 96. The central importance of Kudva's contribution to the claimed inventions
18 pervades the White Paper. (See Ex. 1163.)

19 a. Kudva contributed Sutherland's theory of logical effort as applied to
20 constant delay, which is reflected in § 1.2 ("Logical Effort and Gain") of the White Paper.
21 (See Ex. 1163 § 1.2 (at 3-4); Kudva Dep. 39:1-16, 40:1-13; Ex. 1661 ¶¶ 7-8.)

22 b. Kudva performed the experiments and wrote source code for the
23 statistical wire load model, which is reflected in § 2 ("Methodology") of the White Paper.
24 (See Ex. 1163 § 2 (at 5-9); Kudva Dep. at 42:22-45:16; Ex. 1661 ¶¶ 7-8; Ex. 1211.)

25 c. Kudva and van Ginneken collaborated on § 3.2 ("Transition Time
26 Effects") of the White Paper. (See Ex. 1163 § 3.2 (at 11); Kudva Dep. 50:8-22.)

27 d. Kudva and van Ginneken collaborated on § 3.3 ("Library Design
28 Recommendations") of the White Paper. (See Ex. 1163 § 3.3 (at 12-13); Kudva Dep.

1 50:8-50:22.)

2 e. Kudva and van Ginneken collaborated on §§ 4.1, 4.2, 4.3, 4.4, 4.5, and
3 part of § 4.6 of the White Paper, all of which come under the title of "Constant Delay
4 Synthesis." (See Ex. 1163 § 4 (at 13-18); Kudva Dep. 51:3-52:11; Ex. 1211.)

5 97. The theory of logical effort provided van Ginneken and Kudva with a method
6 to set target delays and measure delays in a size-independent fashion. (See Tr.
7 1175:13-1177:22 (Sarrafzadeh).)

8 **K. KUDVA'S CONTRIBUTIONS TO THE CONCEPTION OF THE INVENTIONS**
9 **AS EXEMPLIFIED IN CLAIMS 49 AND 50 OF THE '446 PATENT**

10 98. Kudva contributed to the conception of the claims in the '446 and '438
11 Patents. (See van Ginneken Dep. 184:11-187:12, 307:25-308:17; Trial Ex. 1661 ¶ 6; see
12 also Tr. 1168:6-11, 1219:14-21 (Sarrafzadeh).)

13 99. Claim 49 of the '446 Patent claims:

14 An automated method of modeling the delay of the cells of an
15 integrated circuit comprising the steps of:
16 associating an initial gain value with each cell that has been initially
17 selected for inclusion in the integrated circuit;
18 computing the initial intended delay value of each cell based on the
19 initial intended gain value.

20 (See Ex. 3 at 22:1-7.)

21 100. Claim 49 requires that the target delay be set as a function of gain. This
22 insight was contributed by Kudva. (See Tr. 1180:18-24, 1168:23-1169:1 (Sarrafzadeh).)

23 101. A gain-based method for computing delays for arbitrary cells – unlike
24 methods such as Mead that are applicable only to inverters – satisfies claim 49's
25 requirement that the method work for "each cell" in an "integrated circuit." (See Tr.
26 1181:3-23 (Sarrafzadeh).)

27 102. Claim 50, which is dependent on claim 49, recites "[t]he automated method of
28 claim 49, wherein the initial intended gain value is determined such that the variation in the
variable component of the initial intended delay is the same for all the cells in the circuit
[and] is minimized." (See Ex. 3 at 22:8-11.)

103. The Sutherland paper, which was contributed by Kudva, provided an insight

1 that led directly to the invention described in claim 50. Under Sutherland's equation for the
 2 delay of a cell, $d = gh + p$, the stage effort (g times h) is the "variable component" of the
 3 delay, and parasitic delay, p , is constant. (See Tr. 1120:18-1121:23, 1122:11-1123:23
 4 (Friedman); Ex. 1085 at 2, equation (4).) Sutherland states that the delay of a path of cells
 5 will be minimized when each stage on the path has the same minimized or "optimal" stage
 6 effort, which is logical effort (g) multiplied by electrical effort (h). (See Ex. 1085 at 6; Tr.
 7 1120:18-1121:23 (Friedman), 1178:3-1179:12 (Sarrafzadeh); van Ginneken Dep. 43:1-20.)

8 104. The specification for the '446 and '438 Patents stresses the importance of the
 9 theory of logical effort to the claimed inventions. The specification cites to Sutherland, and
 10 applies the theory of logical effort to gain-based synthesis. (See, e.g., Ex. 3 at 2:57-65,
 11 7:12-28.)

12 105. Additionally, during the prosecution history of the '446 patent, the applicant
 13 asserted in response to an Office Action that "the claimed invention can be characterized
 14 as a gain-based delay model." (See Ex. 4 (Response to Office Action (Oct. 26, 2000) at 7.)
 15 The prosecution history also demonstrates that the ability to calculate delay for cells other
 16 than buffers (chains of inverters) was necessary for the patentability of the claimed
 17 invention. During prosecution of the '446 patent, the examiner rejected as obvious claim 43
 18 (which ultimately issued as claim 49), stating that Doreswamy (U.S. Patent No. 5,798,935)
 19 computed the initial intended delay for buffers based on initial intended gain. (See Ex. 4
 20 (Office Action (June 8, 2000)) ¶¶ 6 and 21 and n. 3.) In response, the applicant argued:
 21 "Not only are cells that are not buffers necessarily selected by the claim 43 method, but
 22 there logically cannot be any concept of the recited initial gain value of each selected cell
 23 when one is providing a 'collection of buffer types' as taught in claim 1 of Doreswamy."
 24 (See Ex. 4 (Response to Office Action (Oct. 26, 2000)) at 6-7 (emphasis in original).) In the
 25 following office action, the examiner indicated that claim 43 contained allowable subject
 26 matter. (See Ex. 4 (Office Action (Jan. 18, 2001)) ¶ 23.)

27 **L. STEPS TAKEN BY SYNOPSIS TOWARD PATENTING THE INVENTIONS**
 28 **DEVELOPED BY VAN GINNEKEN AND KUDVA; VAN GINNEKEN'S**
SUBMISSION OF PAPER WITHOUT CREDITING KUDVA

1 106. In the spring of 1996, Synopsys decided to begin the process of drafting
2 patent applications for the gain-based synthesis inventions developed by van Ginneken
3 and Kudva. (See van Ginneken Dep. 75:4-17, 76:4-24.)

4 107. Synopsys asked van Ginneken to prepare patent applications claiming the
5 constant delay and gain-based synthesis inventions. (See van Ginneken Dep. 75:4-17,
6 76:4-24; Ex. 1152; Ex. 1198.)

7 108. At the same time that he was working on the draft patent applications for the
8 gain-based synthesis inventions that he and Kudva had developed, van Ginneken was
9 preparing for publication a paper containing the same concepts, titled "Driving on the
10 Left-Hand Side of the Performance Speedway" ("Driving Paper"). (See Ex. 1195.)

11 109. The Driving Paper reflects the centrality of Kudva's contribution of the theory
12 of logical effort, stating: "This paper applies . . . the concept of 'logical effort' to logic
13 synthesis. The concept of logical effort is used to motivate the constant delay model for
14 logic synthesis, and to determine appropriate constant delays for library cells. The paper
15 proposes area analysis and optimization methods based on 'electrical effort' or gain." (See
16 Ex. 1195 at SY012221.)

17 110. Synopsys did not disclose to Kudva or IBM either its preparation of the draft
18 patent applications or its preparation of the Driving Paper. (See Kudva Dep. 137:14-138:3;
19 166:16-23.)

20 111. The Driving Paper copied significant portions from the White Paper, including
21 portions contributed by Kudva. (See Kudva Dep. 143:5-146:11; Tr. 622:2-624:4,
22 627:18-629:4, 629:15-631:2 (Harris).)

23 112. The majority of the ideas in the Driving Paper reflected work on which Kudva
24 and van Ginneken had collaborated. (See Kudva Dep. 145:17-146:11.)

25 113. The following sections of the Driving Paper included material on which Kudva
26 and van Ginneken had collaborated: §§ 1 ("Introduction"), 2 ("Logical Effort"), 3 ("Constant
27 Delay Synthesis"), 4 ("Mapping for Delay"), 7 ("Discrete Sizing Algorithms"), 8 ("Library
28 Analysis"), and 10 ("Cell Generators"). (See Kudva Dep. 143:5-146:11.)

1 114. Additionally, portions of §§ 5 ("Area Estimation"), 6 ("Area Optimization"), and
2 9 ("Accuracy") of the Driving Paper, as well as the "Open Problems" section and
3 "Conclusion," included material on which Kudva and van Ginneken had collaborated. (See
4 Kudva Dep. 143:5-146:11.)

5 115. In the late summer of 1996, van Ginneken submitted the Driving Paper to
6 Professor Ralph Otten ("Otten") for publication at the November 1996 ICCAD. (See Tr.
7 755:17-20 (Damiano).)

8 116. In September 1996, a description of the Driving Paper was published in the
9 Advance Program for the 1996 ICCAD. (See Ex. 1797.)

10 117. Like the Driving Paper itself, the Advance Program underscored the centrality
11 of the theory of logical effort, which Kudva had contributed, to the inventions. The Advance
12 Program stated: "We extend Sutherland & Sproull's theory of logical effort and apply it to
13 logic synthesis. In this context, we review the mapping algorithm of Eric Lehman et al. and
14 Grodstein's delay model for continuously sized networks." (See Ex. 1797.)

15 118. Both IBM and Synopsys considered the research conducted by van Ginneken
16 and Kudva under the JDA, and, in particular, their development of gain-based synthesis, to
17 be jointly owned.

18 a. Members of the IBM NGSS team, including Kudva, were upset when
19 they saw the description in the Advance Program because it failed to credit Kudva as
20 co-author and contributor and threatened to expose sensitive proprietary information to
21 competitors. (See Ex. 1202; Kudva Dep. 139:3-12, 145:17-146:11.)

22 b. Kudva's supervisor, Leon Stok ("Stok"), objected to Damiano about
23 Synopsys's proposed publication of the Driving Paper and, in particular, to the "explicit
24 mention to apply the 'logical effort' work to logic synthesis," on the ground Kudva
25 contributed that concept to the White Paper, and the White Paper constituted joint IBM and
26 Synopsys confidential information. (See Exs. 1202, 1204.) Stok suggested revising the
27 Driving Paper to replace the theory of logical effort with the equation from Glasser, for the
28 reason that Glasser did not teach how to use gain to select the delays of arbitrary cells.

1 (See Ex. 1204.)

2 c. In response to IBM's protests, Synopsys ordered van Ginneken to
3 withdraw the Driving Paper from publication to avoid "giving away confidential information
4 to our competitors." (See Tr. 851:21-25 (Damiano); van Ginneken Dep. 86:12-87:9.)

5 d. Van Ginneken called Kudva to apologize for the controversy
6 surrounding the submission of the Driving Paper to ICCAD. (See Kudva Dep.
7 154:13-155:2.)

8 e. Because of the controversy surrounding van Ginneken's proposed
9 presentation of the Driving Paper at the 1996 ICCAD, Synopsys stopped work on drafting
10 patent applications with respect to any aspects of van Ginneken's constant delay research.
11 (See van Ginneken Dep. 76:4-24.)

12 f. Synopsys saw little commercial value in joint patents, in part because
13 of concerns that, under the JDA, IBM's participation would be required to enforce the
14 patents against Synopsys's EDA competitors and that IBM would have the right to license
15 the joint patents to any company without accounting to Synopsys. (See O'Connor Dep.
16 93:5-94:15, 103:18-105:5, 105:9-13, 109:11-110:3; van Ginneken Dep. 75:4-17, 76:4-17;
17 Ex. 1352 at IBM002905-2906.)

18 **M. DEVELOPMENT AND TESTING OF SYNZILLA**

19 119. At a three-day workshop held from June 25 through June 27, 1996 in
20 Yorktown, New York, the joint IBM-Synopsys NGSS group met and agreed to develop a
21 synthesis system based on the constant delay paradigm and concept of gain-based
22 synthesis described in the van Ginneken-Kudva White Paper. (See Ex. 1169; Ex. 1176;
23 Ex. 1179; Drumm Dep. 139:7-140:1.) The parties gave the project the code-name Synzilla.
24 (See Tr. 741:15-23, 743:17-744:8, 819:20-820:11, 823:2-14 (Damiano).)

25 120. For the next year the NGSS team, composed of IBM and Synopsys
26 engineers, collaborated in the writing of source code for Synzilla, and ultimately produced a
27 prototype. (See O'Connor Dep. 141:16-143:10.)

28 121. In May 1997, van Ginneken resigned from Synopsys. (See Tr. 854:2-4

1 (Damiano).)

2 122. As of May 1997, Synzilla was only a prototype, and, as set forth in the "IBM
3 Synopsys R&D Alliance Update" dated May 6, 1997, "essential functions" in the following
4 areas needed to be created: anchor code, library analysis, timing, placement, optimization,
5 timing driven optimization, technology mapping, and timing correction. (See Ex. 143 at
6 SNP000178.)

7 123. In mid-1997, Synopsys and IBM conducted experiments using Synzilla to
8 determine whether or not constant delay synthesis was a viable technology; the results of
9 these tests were presented at a July 16, 1997 IBM-Synopsys Joint R&D Alliance meeting
10 ("Alliance Meeting"). (See Ex. 1428.) The testing focused solely on synthesis, and did not
11 include placement or routing. (See Tr. 774:20-776:9 (Damiano), 853:7-13 (Shenoy).)

12 124. The inventions in the '446 and '438 Patents were not jointly reduced to practice
13 before van Ginneken resigned from Synopsys in May 1997. (See Ex. 144 Tab 4 (Magma's
14 Supplemental Responses to Synopsys's First Set of Requests for Admissions) at Request
15 for Admission Nos. 8, 12.)

16 125. There was no fundamental change to the logic synthesis portion of Synzilla
17 after May 1997, when van Ginneken resigned from Synopsys, and before the July 1997
18 Alliance Meeting with IBM. (See Tr. 775:11-14 (Damiano).) Similarly, although IBM and
19 Synopsys engineers continued to revise the Synzilla code after van Ginneken left Synopsys
20 in May 1997, (see Ex. 1659-2), no significant new function was added to Synzilla between
21 May 1997 and the July 1997 Alliance Meeting. (See Tr. 854:1-855:18 (Damiano).)

22 126. After the above-referenced testing was completed, Shenoy led an effort at
23 Synopsys to test the integration of placement and synthesis in Synzilla. (See Tr. 941:24-
24 942:19, 943:7-20 (Shenoy).) Synopsys ran the tests using sample designs provided by
25 Intel. (See Tr. 777:9-16 (Damiano), 943:4-13 (Shenoy).) No IBM personnel participated in
26 these tests. (See Tr. 792:21-793:13 (Damiano); 942:11-15, 942:20-943:3, 955:25-956:2
27 (Shenoy); Hieter Dep. at 52:5-53:10, 75:1-76:2, 83:2-14.)

28 127. The Synzilla experiments on the Intel test cases were conducted using a

1 number of different methodologies. (See Tr. 943:21-946:24 (Shenoy).) Some of the
2 experiments included gain-based synthesis, but others did not. (See Tr. 943:21-946:7
3 (Shenoy); Ex. 129 at SY008861.) The test results alone do not indicate whether a
4 particular experiment included gain-based synthesis, or whether the test performed each
5 element of the patent claims. (See Tr. 545:25-547:11 (Harris); 946:8-24, 953:15-954:18
6 (Shenoy); Exs. 1504, 1520.)

7 128. Both Synopsys and Intel considered the Synzilla experiments to be a failure.
8 (See Tr. 786:8-11 (Damiano); 947:17-948:15, 952:21-953:11 (Shenoy); O'Hara Dep. 79:11-
9 81:8.)

10 **N. SYNZILLA'S ROUGH PLACER**

11 129. Synzilla included a "rough placer" that would establish initial locations for the
12 cells and compute the wire length between the cells. (See Damiano Dep. 248:17-249:3;
13 Ex. 1615; Ex. 1659-2.)

14 130. IBM engineer Anthony Drumm ("Drumm") contributed code for a wire load
15 estimator used in the rough placer; Drumm's software estimated the length of wires
16 connecting cells together, and was used in Synzilla to size the cells. (See Drumm Dep.
17 139:15-140:25, 142:5-16.)

18 131. Synopsys engineer Shenoy worked with the NGSS team on the rough placer
19 and incorporated Drumm's code into the rough placer. (See Tr. 971:20-972:9 (Shenoy).)

20 132. Drumm's code "operated and worked with Synzilla." (See Drumm Dep.
21 142:5-16.)

22 **O. VAN GINNEKEN'S ASSIGNMENT OF INVENTIONS TO SYNOPSYS**

23 133. On May 17, 1995, van Ginneken signed a Proprietary Information and
24 Inventions Agreement ("Agreement") as a condition to his employment with Synopsys.
25 (See Ex. 26 ¶ 2 and Ex. 98.) The Agreement provides, inter alia, that "Proprietary
26 Information" created, discovered, or developed by van Ginneken during his employment
27 with Synopsys is the sole property of Synopsys. (See Ex. 98 ¶ 3A.) The Agreement
28 defines "Proprietary Information" to include, inter alia, trade secrets, processes, know-how,

1 computer software, improvements, and inventions. (See id. ¶ 1.) The Agreement further
2 provides that any rights van Ginneken may have or acquire in any "Inventions" are
3 assigned to Synopsys. (See id. ¶ 3D.) The Agreement defines "Inventions" to include "all
4 improvements, inventions, works of authorship, processes, techniques, know-how,
5 formulae, data, ideas and other information . . . whether or not patentable, made or
6 conceived or reduced to practice or learned" by van Ginneken during the term of his
7 employment, either alone or jointly with others. (See id. ¶ 3C.)

8 134. Van Ginneken never objected to the scope of the terms of the Agreement or
9 asked Synopsys for any waiver from the enforcement of its provisions. (See Ex. 26 ¶ 7.)

10 135. When signing the Agreement, van Ginneken provided a list to Synopsys of
11 the inventions to which he had contributed prior to his employment with Synopsys, and
12 represented to Synopsys that the list was complete. (See Ex. 26 ¶ 4; Ex. 98 at SY000007-
13 9.) None of the inventions claimed in the '446 or '438 patents is included in the list of prior
14 inventions van Ginneken provided to Synopsys. (See Ex. 26 ¶ 5.)

15 **P. KUDVA'S ASSIGNMENT OF INVENTIONS TO IBM**

16 136. On January 17, 1996, Kudva signed an "Agreement Regarding Confidential
17 Information and Intellectual Property" with IBM. (See Ex. 1121.) Said agreement provides,
18 inter alia: "I hereby assign to IBM my entire right, title and interest in any idea, concept,
19 technique, invention, design, (whether the design is ornamental or otherwise); computer
20 programs and related documentation, other works of authorship, mask works and the like
21 (all hereinafter called "Developments"), hereafter made, conceived, written or otherwise
22 created solely or jointly by me, whether or not such Developments are patentable, subject
23 to copyright protection or susceptible to any other form of protection which: (a) relate to the
24 actual or anticipated business or research or development of IBM or its subsidiaries, or (b)
25 are suggested by or result from any task assigned to me or work performed by me or on
26 behalf of IBM or its subsidiaries." (See Ex. 1121 ¶ 4.) Kudva stated in said agreement that
27 he had no previously conceived Developments that he wished to exclude from the
28 agreement. (See id. ¶ 7.)

1 **Q. VAN GINNEKEN'S EMPLOYMENT AT MAGMA; MAGMA'S FILING OF**
2 **PATENT APPLICATIONS IDENTIFYING VAN GINNEKEN AS SOLE**
3 **INVENTOR**

4 137. In May 1997, while IBM and Synopsys were still operating under the JDA, van
5 Ginneken resigned from Synopsys in order to join Magma. (See Ex. 26 ¶ 28.)

6 138. On December 24, 1997, Magma filed a provisional patent application with the
7 PTO, which eventually led to the issuance of the '446 and '438 patents. (See Ex. 133.)

8 139. During prosecution of the '446 and '438 patents, Magma consistently
9 represented to the PTO that van Ginneken was the sole inventor of the patents. (See, e.g.,
10 Ex. 2 at 5, Ex. 4 at 5.)

11 140. Without van Ginneken's direct involvement, Magma also filed patent
12 applications for van Ginneken's asserted inventions in other foreign patent offices around
13 the world. (See van Ginneken Dep. 315:11-316:2.) The foreign patent applications are:
14 Japan Patent Application No. JP20000526885T, Israel Patent Application No. IL136709D,
15 Canada Patent Application No. CA2317538, European Patent Application No. EP1040435,
16 and International Patent Application No. WO9934310. (See Exs. 14-17, 125.) During
17 prosecution of these foreign patent applications, Magma consistently represented that van
18 Ginneken was the sole inventor of the inventions claimed therein. (See Exs. 14-17, 125.)

19 141. On September 17, 2002, the PTO issued the '446 patent to Magma. (See Ex.
20 3.) Van Ginneken is listed as the sole inventor of the '446 patent. (See id.) The inventions
21 claimed in the '446 patent are the same inventions conceived by van Ginneken and Kudva
22 while van Ginneken was employed at Synopsys. (See Ex. 26 ¶ 44; Ex. 144 (Magma's
23 Supplemental Response to First Set of Requests for Admissions) at RFA 5 and 6.)

24 142. On April 20, 2004, the PTO issued the '438 patent to Magma. (See Ex. 1.)
25 Van Ginneken is listed as the sole inventor of the '438 patent. (See id.) The inventions
26 claimed in the '438 patent are the same inventions conceived by van Ginneken and Kudva
27 while van Ginneken was employed at Synopsys. (See Ex. 26 ¶ 45; Ex. 144 (Magma's
28 Supplemental Response to First Set of Requests for Admissions) at RFA 9 and 10.)

 143. On April 19, 2004, Magma filed United States Patent Application No.

1 10/828,547, which is a continuation of, inter alia, the applications that issued as the '446
2 and '438 patents. (See Ex. 20.) The application lists van Ginneken as the sole inventor of
3 the inventions claimed in Application No. 10/828,547. (See id., last page.)

4 144. On multiple occasions after the filing of the instant action on September 17,
5 2004, Magma filed documents with the PTO identifying van Ginneken as the sole inventor
6 of the inventions claimed in the '446 and '438 patents. (See Exs. 19, 28, 78.) Such
7 representations to the PTO occurred after Magma took the position, in discovery responses
8 herein, that van Ginneken was not the sole inventor of the inventions claimed in the '446
9 and '438 patents. (See Exs. 1837, 1840.) Magma additionally submitted to the PTO,
10 however, the pleadings in the instant litigation, which set forth the parties' dispute over the
11 inventorship and ownership of the '446 and '438 patents. (See Exs. 22, 25.)

12 145. On October 6, 2005, Magma filed two additional patent applications, United
13 States Patent Applications Nos. 11/245,530 and 11/246,451, both of which applications
14 claim priority from the December 1997 provisional application. (See Exs. 77 and 78.)
15 Although said applications identify van Ginneken as the sole inventor of the claimed
16 inventions, Magma expressly stated in each application: "This continuation application has
17 been filed to maintain the status quo in view of the dispute over inventorship and ownership
18 that is currently being litigated between Magma and Synopsys. The filing of this
19 continuation application is not a representation that the applications identify the correct
20 inventors[.]" (See Ex. 77 at 28; Ex. 78 at 28.)

21 CONCLUSIONS OF LAW

22 A. BURDENS OF PROOF

23 "Because a patent is presumed valid under 35 U.S.C. § 282, there follows a
24 presumption that the named inventors on a patent are the true and only inventors."
25 Gemstar-TV Guide International, Inc. v. International Trade Commission, 383 F.3d 1352,
26 1381 (Fed. Cir. 2004). A challenge to the inventorship of a patent must be proven by clear
27 and convincing evidence. See id. at 1382 ("Alleged co-inventors must establish their co-
28 inventorship by facts supported by clear and convincing evidence."); Eli Lilly and Company

1 v. Aradigm Corp., 376 F.3d 1352, 1358 (Fed. Cir. 2004) ("The general rule is that a party
2 alleging misjoinder or non-joinder of inventors must meet the heavy burden of proving its
3 case by clear and convincing evidence.").

4 There is no such heightened burden imposed on challenges to patent ownership. "It
5 is elementary that inventorship and ownership are separate issues." Beech Aircraft Corp.
6 v. EDO Corp., 990 F.2d 1237, 1248 (Fed. Cir. 1993). Inventorship "is a question of who
7 actually invented the subject matter claimed in a patent," while ownership "is a question of
8 who owns legal title to the subject matter claimed in a patent[.]" See id. Unlike
9 inventorship, which is an issue of federal law, see The University of Colorado Foundation,
10 Inc. v. American Cyanamid Co., 196 F.3d 1366, 1372 (Fed. Cir. 1999), "the question of who
11 owns the patent rights and on what terms typically is a question exclusively for state
12 courts." See Jim Arnold Corp. v. Hydrotech Systems, Inc., 109 F.3d 1567, 1572 (Fed. Cir.
13 1997); see also Regents of the University of New Mexico v. Knight, 321 F.3d 1111, 1118
14 (Fed. Cir. 2003) ("State law governs contractual obligations and transfers of property rights,
15 including those relating to patents."). The parties have cited no case, and the Court has
16 located none, holding that a party challenging patent ownership must prove its claim by
17 clear and convincing evidence. See, e.g., id. at 1121 (affirming district court's
18 determination of ownership of patents under New Mexico law; no mention of "clear and
19 convincing evidence" standard).

20 Synopsys argues that it is the owner of the '446 and '438 patents because van
21 Ginneken, the named inventor of those patents, invented the subject inventions while he
22 worked at Synopsys. Synopsys thus is challenging only ownership, not inventorship, of
23 said patents, and the Court finds Synopsys must prove its claim of ownership of the '446
24 and '438 patents by a preponderance of the evidence.⁴

25 Magma argues that IBM is a co-owner of the '446 and '438 patents, under both the
26 JDA and under patent law, on the ground that Kudva is a co-inventor of the inventions set

27 ⁴ Synopsys is owner of record of the '114 patent; to the extent Magma contends
28 otherwise, Magma bears the burden of proof.

1 forth therein. Magma further argues that IBM is a co-owner of the '446, '438, and '114
2 patents under the JDA on the ground that IBM and Synopsys jointly reduced to practice the
3 inventions set forth therein.

4 The JDA, by its terms, is governed by New York law, see JDA § 12.2; contract
5 claims under New York law must be proven by a preponderance of the evidence. See
6 Enercomp, Inc. v. McCorhill Publishing, Inc., 873 F.2d 536, 542 (2d Cir. 1989). As
7 discussed below, however, the JDA incorporates patent law on the issues of joint
8 conception and reduction to practice. Because "[c]onception is the touchstone of
9 inventorship" under patent law, see Burroughs Wellcome Co. v. Barr Laboratories, Inc.,
10 40 F.3d 1223, 1227 (Fed. Cir. 1994), Magma's challenge to the ownership of any of the
11 subject patents, to the extent such challenge is based on a theory of joint conception, is, in
12 essence, a challenge to inventorship and, consequently, must be proven by clear and
13 convincing evidence. By contrast, reduction to practice is not an element of inventorship
14 under patent law. See Ethicon, Inc. v. U.S. Surgical Corp., 135 F.3d 1456, 1465 (Fed. Cir.
15 1998) (noting "legal distinction between conception (which justifies a finding of inventorship)
16 and reduction to practice (which does not)"). Consequently, Magma's challenge to the
17 ownership of any of the subject patents, to the extent such challenge is based on a theory
18 of joint reduction to practice, is not a challenge to inventorship but, rather, a challenge
19 based solely on the contract, and, thus, must be proven only by a preponderance of the
20 evidence.

21 B. INTERPRETATION OF JDA

22 As noted, Magma argues IBM is a co-owner of the '446, '438, and '114 patents
23 pursuant to the JDA.

24 1. Standing to Assert IBM's Rights Under JDA

25 In a footnote in its post-trial memorandum,⁵ Synopsys argues Magma is precluded
26 from seeking to establish IBM's rights to the patents under the JDA because Magma has

27 ⁵ Synopsys expands on the argument in its proposed findings of fact and
28 conclusions of law. (See Synopsys's Revised Findings at 25-26.)

1 no enforceable rights under the JDA as a third party beneficiary, and because an accused
2 infringer cannot assert the equitable ownership rights of a third party as a defense to a
3 claim of infringement.

4 As Synopsys notes, under New York law, which applies to the JDA, (see JDA
5 § 12.2), "a contract is to be enforced only by those who are parties to it and by those who
6 are its direct beneficiaries" and "before a stranger can avail himself of the exceptional
7 privilege of suing for breach of an agreement, to which he is not a party, he must, at least
8 show that it was intended for his direct benefit." See Ogden Development Corp. v. Federal
9 Insurance Co., 508 F.2d 583, 588 (2d Cir. 1974). Here, however, Magma does not assert
10 a cause of action against Synopsys for breach of the JDA. Rather, in response to
11 Synopsys's claims of infringement, Magma asserts affirmative defenses and counterclaims
12 based on the argument that IBM has licensed Magma to practice the patents. (See TAC
13 Answer ¶¶ 150, 156, 163, 197-98, 211-215, 232-236, 251-255.) Proof of a license to
14 practice a patent is an affirmative defense to a claim of patent infringement. See The
15 Carborundum Co. v. Molten Metal Equipment Innovations, Inc., 72 F.3d 872, 878 (Fed. Cir.
16 1995).

17 In order to demonstrate the validity and applicability of any such license, an issue
18 that is not yet before the Court, Magma first must prove that IBM has ownership rights in
19 the patents. It is black letter law that only a patent owner may license a patent. See, e.g.,
20 35 U.S.C. § 154(a)(1) ("Every patent shall contain . . . a grant to the patentee, his heirs or
21 assigns, of the right to exclude others from making, using, offering for sale, or selling the
22 invention throughout the United States"); Lans v. Digital Equipment Corp., 252 F.3d 1320,
23 1327 (Fed. Cir. 2001) ("[O]nly the patentee has authority to grant licenses[.]").

24 Synopsys cites no authority precluding an accused infringer from attempting to prove
25 the validity of an asserted license by reference to an agreement between the party alleging
26 infringement and the asserted licensor. Mercantile National Bank of Chicago v. Howmet
27 Corp., 524 F.2d 1031 (7th Cir. 1975), upon which Synopsys relies, is distinguishable. In
28 that case, the defendant argued that the patent at issue was unenforceable because one of

1 the joint inventors breached an equitable duty to assign his interest in the patent to a third
2 party. See id. at 1034. The Seventh Circuit rejected the defense, noting “[i]t has long been
3 settled that a third party’s equitable rights in a patent may not be asserted as a defense in
4 an action for infringement brought by the owner of title to the patent.” See id.; see also
5 Dorr-Oliver, Inc. v. Comanco, Inc., 432 F.2d 447, 450 (Ct. Cl. 1970) (“In patent litigation
6 between private parties, equitable rights of ownership of strangers to the suit cannot be
7 raised as defenses against the legal titleholder of a patent.”). Here, by contrast, Magma
8 does not seek to defeat Synopsys’s claim of patent infringement on the ground that
9 Synopsys has breached a duty to IBM; rather, Magma argues that Magma itself has rights
10 in the patents as a result of the asserted license from IBM. Magma is not precluded from
11 asserting such a defense. See, e.g., Schering Corp. v. Zeneca Inc., 104 F.3d 341 (Fed.
12 Cir. 1997) (affirming summary judgment in favor of defendant in infringement suit brought
13 by one patent owner because defendant proved it had license from co-owner of patent).

14 Accordingly, the Court finds Magma is not barred from attempting to prove IBM has
15 ownership rights in the patents pursuant to the JDA.

16 2. Legal Standard re: Contract Interpretation

17 The JDA, by express provision, is “governed by the laws of the State of New York.”
18 (See Ex. 1120 § 12.2.) Under New York law, “[t]he fundamental, neutral precept of
19 contract interpretation is that agreements are construed in accord with the parties’ intent.”
20 See Greenfield v. Philles Records, Inc., 98 N.Y.2d 562, 569 (2002). “The best evidence of
21 what parties to a written agreement intend is what they say in their writing.” Id. (internal
22 quotation and citation omitted). “Thus, a written agreement that is complete, clear and
23 unambiguous on its face must be enforced according to the plain meaning of its terms.” Id.

24 “Extrinsic evidence of the parties’ intent may be considered only if the agreement is
25 ambiguous[.]” Id. “[I]f the agreement on its face is reasonably susceptible of only one
26 meaning, a court is not free to alter the contract to reflect its personal notions of fairness
27 and equity.” Id. at 569-70. “[E]xtrinsic and parol evidence is not admissible to create an
28 ambiguity in a written agreement which is complete and clear and unambiguous on its

1 face." W.W.W. Associates, Inc. v. Giancontieri, 77 N.Y.2d 157, 163 (1990).

2 "Words in a contract are to be construed to achieve the apparent purpose of the
3 parties." Hooper Associates, Ltd. v. AGS Computers, Inc., 74 N.Y.2d 487, 491 (1989).

4 Indeed, when the "purpose sought to be accomplished" is ascertained, "it will take
5 precedence over all other canons of construction." See In re Herzog, 301 N.Y. 127, 135
6 (1950).

7 **3. Joint Ownership of Inventions Jointly Conceived or Jointly**
8 **Reduced to Practice as Part of Collaboration under JDA**

9 As set forth below, the JDA distinguishes inventions developed solely by one party in
10 the performance of the JDA from inventions that resulted from the parties' collaborative
11 efforts under the JDA. The JDA defines "Invention" as:

12 any discovery or improvement, conceived or first reduced to practice during
13 the term of this Agreement in the performance of this Agreement, solely or
14 jointly by one or more employees of Synopsys, or solely or jointly by one or
15 more employees of IBM.

16 (See Ex. 1120 § 1.24). Pursuant to the JDA, a "Joint Invention" is "an Invention conceived
17 or first reduced to practice by one or more employees of one party jointly with one or more
18 employees of the other party." (See id. § 1.25.)

19 The JDA contains separate provisions distinguishing (1) the ownership of Inventions
20 and Joint Inventions from (2) the ownership of Joint Products and NGSS. (See id.
21 §§ 4.1.2.1, 4.1.2.2.) The ownership of Inventions and Joint Inventions is governed by
22 § 4.1.2.1, which provides that "[a]ny Invention made by one party shall be owned by that
23 party," and "[a]ny Joint Invention shall be jointly owned." (See Ex. 1120 § 4.1.2.1.) Joint
24 Products are to be owned jointly. (See Ex. 1120 § 4.1.2.2.) NGSS is to be solely owned by
25 Synopsys, but licensed to IBM for its internal use. (See Ex. 1120 §§ 4.1.2.2, 4.5.)

26 The Court previously has found the language of § 4.1.2.1 to be ambiguous in light of
27 § 4.1.2, which is in the form of a preface to § 4.1.2.1, and states, in its entirety, "As to the
28

1 Joint Products and NGSS.”⁶ In light of § 4.1.2, the JDA contains an ambiguity as to
2 whether § 4.1.2.1 applies only to Inventions and Joint Inventions that are incorporated into
3 Joint Products and NGSS, or whether it applies to all Inventions and Joint Inventions
4 created in the course of the parties’ work in developing Joint Products and NGSS. The
5 Court now resolves that ambiguity.

6 The purpose of the JDA was to “jointly develop new EDA tools,” including the Joint
7 Products and NGSS. (See Ex. 1120 at 1 ¶ A and § 2.1.) Camposano, the only member of
8 the JDA negotiating team who testified at trial, testified that a concern of both parties was
9 how to protect their individual intellectual property while still encouraging the development
10 of joint work. (See, e.g., Tr. 996:10-24 (Camposano).) The parties to the JDA sought “to
11 enable [the parties] to both contribute to the joint work but not be encumbered to do
12 whatever other work [they] were doing at the time, and, also, not to hinder people to
13 actually freely contribute to the joint products that they were to develop.” (See *id.* at
14 996:20-24.) The parties sought, in drafting the JDA, to discourage each other from “trying
15 to hide any discovery that [they] would do during the joint work or not contributing work that
16 was necessary . . . to actually enable the products that [they] were developing.” (See *id.* at
17 996:25-997:10.) Camposano testified that the JDA addressed these concerns in the
18 following manner: “The essential guiding principle was that whatever IP, whatever
19 intellectual property belonged to any of the parties before entering the JDA would continue
20 to belong to that party. Whatever discovery was made during the JDA by one of the parties
21 alone would continue to belong to that party, and the only intellectual property that would
22 be owned jointly was the one that went into the products and that was developed jointly.”
23 (See Tr. 997:12-15 (Camposano); see also Tr. 997:15-998:7, 1002:1-3 (Camposano).)

24 Camposano’s testimony that the parties would jointly own only Joint Inventions that
25 “went into the products” leaves an unusual gap in the ownership provisions of the JDA that
26

27 ⁶ In the Court’s March 30, 2006 summary judgment order, the Court found “an issue
28 of material fact exists as to whether the joint patent provision applies only to inventions
incorporated in ‘Joint Products’ or ‘NGSS.’” (See Docket No. 994 at 13.)

1 fails to further the JDA's purpose of encouraging those who worked on the JDA to
2 contribute all necessary information to the development of the Joint Products and NGSS.
3 Under Camposano's construction, the JDA, while providing for ownership of (1) pre-existing
4 intellectual property, (2) intellectual property developed separately from the product
5 development activities of the JDA, and (3) inventions incorporated into products, (see Ex.
6 1120 § § 4.1.1, 4.1.2.1), would contain no provision for the ownership of Inventions or Joint
7 Inventions that ultimately were not incorporated into a product. Neither Synopsys, IBM, nor
8 any of its inventors working on the development of the Joint Products or NGSS would know
9 at the time of invention, however, whether any invention ultimately would be incorporated
10 into a product. Consequently, Camposano's construction of the JDA would create precisely
11 the type of confusion as to ownership of new inventions that the JDA was intended to
12 avoid.⁷ Accordingly, the Court does not credit Camposano's testimony that § 4.1.2.1 was
13 intended to apply only to Inventions and Joint Inventions incorporated into Joint Products or
14 NGSS.

15 The Court finds the only way to interpret § 4.1.2, i.e., the phrase "As to the Joint
16 Products and NGSS," in accordance with the purposes of the JDA is to construe it as if it
17 were worded "As to Intellectual Property Developed Pursuant to the JDA's Product
18 Development Activities," as distinguished from the "intellectual property developed separate
19 from the product development activities of [the JDA]," which is the subject of § 4.1.1.⁸
20 Under such construction, the JDA provides for ownership of all intellectual property
21 developed in the course of the parties' joint development activities, as well as all intellectual
22 property developed separately therefrom. Specifically, pursuant to § 4.1.1, each party's
23 pre-existing intellectual property, as well as any intellectual property thereafter developed
24 by that party separately from the product development activities of the JDA, are owned by

25
26 ⁷ The Court notes that Camposano was not asked how ownership of Inventions and
27 Joint Inventions created during the parties' development activities, but not actually
incorporated into a product, would be determined.

28 ⁸ The absence of a corresponding preface to § 4.1.1 is not significant, as the JDA
would hardly be described as a model for the practice of outlining.

1 that party; pursuant to § 4.1.2, Inventions and Joint Inventions arising out of the product
2 development activities of the JDA are owned by the party or parties who made them, any
3 Joint Products ultimately created are jointly owned by the parties, and NGSS is owned by
4 Synopsys. Such construction also is consistent with the JDA's definition of Invention, which
5 includes "any discovery or improvement, conceived or first reduced to practice during the
6 term of [the JDA] in the performance of [the JDA]." (See Ex. 1120 § 1.24) (emphasis
7 added)).

8 Accordingly, the Court finds § 4.1.2.1 addresses the ownership of Inventions and
9 Joint Inventions created or reduced to practice in furtherance of the JDA's product
10 development activities, and is not limited to Inventions that ultimately are incorporated into
11 Joint Products or NGSS; consequently, Joint Inventions are jointly owned by IBM and
12 Synopsys regardless of whether the Joint Inventions are so incorporated. (See Ex. 1120
13 § 4.1.2.1.)

14 **4. Effect of Dissolution Agreement on IBM's Joint Ownership of** 15 **Joint Inventions.**

16 As the Court previously has noted, the Dissolution Agreement "incorporates the
17 terms of § 4 of the JDA, except as expressly modified." (See Amended Order Denying
18 Motions for Summary Judgment Re: Patent Ownership (Docket No. 994) ("SJ Order")
19 14:5-7; see also Ex. 1120 at IBM000098.) Because the Dissolution Agreement did not
20 modify § 4.1.2.1, (see Ex. 1120 at IBM000098), the provision of the JDA that addresses
21 ownership of Inventions and Joint Inventions, the parties retain co-ownership of any Joint
22 Invention conceived or reduced to practice as part of the JDA's product development
23 activities.

24 Although the Dissolution Agreement contains limitations on the use of NGSS
25 Information⁹ by both IBM and Synopsys, it does not purport to transfer the ownership of any

26 ⁹ As noted, the JDA defines "NGSS Information" as "Information generated by the
27 Joint Development Team relating to any specific result of the parties' partial or completed
28 development work, relating to NGSS," including, but "not limited to, any tool specification,
design Information, Code, Documentation, specification, or quality or reliability Information
for any NGSS." (See Ex. 1120 § 1.32.) "Information" includes "information in visual, oral,

1 Joint Inventions relating to NGSS. In particular, pursuant to § 4.23 of the Dissolution
2 Agreement, Synopsys granted IBM a ten-year license to "all of Synopsys's rights in NGSS
3 Information" for IBM's internal use and "for use in the design, development, analysis,
4 support or manufacture of semiconductor or integrated circuit products to be fabricated by
5 IBM or any IBM Subsidiary for any of their customers." (See Ex. 1120 at IBM00102-03.)
6 Synopsys further granted IBM a license, beginning ten years after the dissolution date, to
7 use "all of Synopsys's rights in NGSS Information" for any purpose. (See Ex. 1120 at
8 IBM00103.) Synopsys agreed, pursuant to the Dissolution Agreement, that it would "not
9 further develop NGSS . . . or distribute NGSS Information . . . to any third party." (See Ex.
10 1120 at IBM00104.) Nothing in the Dissolution Agreement purports to transfer ownership
11 of any Joint Invention under the JDA.

12 Section 13 of the Dissolution Agreement obligates IBM to inform its employees "of
13 the restrictions on IBM's use of . . . NGSS Information" acquired during the term of the JDA.
14 (See Ex. 1120 at IBM000108.) In other words, § 13 governs only the method by which IBM
15 was to notify its employees as to how IBM may use information, including NGSS
16 Information, acquired or created during work performed under the JDA. Neither the
17 language of § 13 of the Dissolution Agreement, nor any provision of the JDA itself,
18 terminates IBM's ownership rights in Joint Inventions conceived or reduced to practice as
19 part of the JDA's product development activities.

20 Accordingly, the Court finds the Dissolution Agreement did not terminate IBM's
21 ownership rights in any Joint Invention conceived or reduced to practice as part of the
22 JDA's product development activities.

23 **5. Conception and Reduction to Practice Under JDA**

24 Pursuant to the JDA, a Joint Invention is "any discovery or improvement, conceived
25 _____
26 written or other tangible form" that the parties may disclose to one another, or that may be
27 created by one or both parties, pursuant to the JDA. (See Ex. 1120 § 1.23.) Although
28 NGSS Information includes certain work product arising from the parties' joint activities, the
JDA's definition of NGSS Information does not address, limit, or modify the ownership of
Inventions and Joint Inventions arising out of the development of NGSS. Ownership of
Inventions and Joint Inventions is addressed separately in § 4.1.2.1 of the JDA.

1 or first reduced to practice during the term of [the JDA] in the performance" of the JDA "by
2 one or more employees of one party jointly with one or more employees of the other party."
3 (See Ex. 1120 §§ 1.24, 1.25 (emphasis added).) Thus, any "discovery or improvement"
4 that is jointly conceived is jointly owned, regardless of whether it is reduced to practice.
5 The parties dispute whether the JDA incorporates the patent law standard for conception or
6 whether it sets forth a separate standard for conception.

7 The JDA's definition of "Invention" as "any discovery or improvement," (see Ex. 1120
8 § 1.24), uses the identical words as are used to define an invention under patent law. See
9 35 U.S.C. § 100(a) (defining "invention" as "invention or discovery"); 35 U.S.C. § 101
10 (providing "[w]hoever invents or discovers any new and useful process, machine,
11 manufacture, or composition of matter, or any new and useful improvement thereof, may
12 obtain a patent therefor"). Under patent law, "[c]onception is the touchstone of
13 inventorship[.]" See Burroughs Wellcome, 40 F.3d at 1227.

14 Under New York law, the law applicable to the interpretation of the JDA, a contract is
15 interpreted by reference to "the reasonable expectation and purpose of the ordinary
16 business[person], in the factual context in which terms of art and understanding are used[.]"
17 See Uribe v. Merchants Bank of New York, 91 N.Y.2d 336, 341 (1998) (internal quotation
18 and citation omitted; alteration in original). Here, in light of the JDA's express provision for
19 potential "patents issued" on the parties' "Joint Inventions," (see Ex. 1120 § 4.1.2.1), the
20 parties reasonably could expect that terms common to patent law and used in the JDA,
21 such as "invention," "discovery," "improvement" "conceive," and "reduction to practice" were
22 to be understood in accordance with their meaning under patent law. Additionally, under
23 New York law, "[t]echnical words in a contract must be taken in a technical sense unless
24 the context of the instrument or a usage which is applicable clearly indicates a different
25 meaning." See Nau v. Vulcan Rail & Construction Co., 286 N.Y. 188, 198 (1941) (holding
26 contract's reference to "infringement" suits did not encompass interference proceedings
27 because "the words and expressions 'infringement,' 'infringement suits,' 'interference' and
28 'interference proceedings' are words and expressions of art and have a definite, technical

1 and well-understood meaning . . . [and] [b]oth parties . . . knew the difference in meaning");
 2 see also Kabushiki Kaisha Hattori Seiko v. Refac. Technology Development Corp., 690 F.
 3 Supp. 1339, 1341, 1343 (S.D.N.Y. 1988) (looking to definition of "scope" as "established in
 4 patent law," for purposes of interpreting license to make products "within the scope of"
 5 certain patents).¹⁰ Nothing in the JDA, and no other evidence cited by the parties, suggests
 6 that the parties intended to define "conception" and "reduction to practice" of an invention
 7 other than by reference to the meaning of those terms under patent law.

8 Accordingly, the Court will apply patent law in determining whether Synopsys and
 9 IBM jointly conceived and/or jointly reduced to practice any of the inventions claimed in the
 10 patents.

11 C. JUDICIAL ESTOPPEL

12 Before turning to the issue of joint conception, the Court first addresses Synopsys's
 13 argument that Magma is judicially estopped from asserting that Kudva is a co-inventor of
 14 the '446 and '438 patents because Magma obtained issuance of those patents by
 15 representing to the PTO that van Ginneken was the sole inventor thereof, and continued to
 16 make such representations in further proceedings before the PTO, a position that is
 17 contrary to the position Magma took at trial.

18 Judicial estoppel is "an equitable doctrine invoked by a court at its discretion" where
 19 necessary "to prevent improper use of judicial machinery." See New Hampshire v. Maine,
 20 532 U.S. 742, 750 (2001) (internal quotations and citations omitted). "[A]bsent any good
 21 explanation, a party should not be allowed to gain an advantage by litigation on one theory,
 22 and then seek an inconsistent advantage by pursuing an incompatible theory." Id. at 749

23
 24 ¹⁰ American Telephone and Telegraph Co. v. Integrated Network Corp., 972 F.2d
 1321 (Fed. Cir. 1992), upon which Magma relies, is distinguishable. In that case, the issue
 25 was whether state law claims based on an employee's breach of an agreement to assign
 26 inventions to his employer presented a question of patent law sufficient to confer federal
 27 jurisdiction. See id. at 1322. The Federal Circuit held that the meaning of the phrase
 28 "inventions . . . conceived," in the agreement there at issue, was not necessarily a question
 of patent law, and that the state court of New Jersey should "decide what state law has to
 say about [the] contract." See id. at 1324. Here, by contrast, jurisdiction is not the issue
 and, in any event, under New York law, as discussed above, the term "conceived" must be
 interpreted by reference to patent law.

(internal quotation and citation omitted). Several factors typically inform a court's decision as to whether to apply the doctrine of judicial estoppel:

First, a party's later position must be clearly inconsistent with its earlier position. Second, courts regularly inquire whether the party has succeeded in persuading a court to accept that party's earlier position, so that judicial acceptance of an inconsistent position in a later proceeding would create the perception that either the first or the second court was misled. Absent success in a prior proceeding, a party's later inconsistent position introduces no risk of inconsistent court determinations, and thus poses little threat to judicial integrity. A third consideration is whether the party seeking to assert an inconsistent position would derive an unfair advantage or impose an unfair detriment on the opposing party if not estopped.

Id. at 750-51 (internal quotations and citations omitted). The above-referenced factors are not exclusive; "[a]dditional considerations may inform the doctrine's application in specific factual contexts." *See id.* at 751.

Ninth Circuit, rather than Federal Circuit, law governs the Court's application of judicial estoppel. *See Lampi Corp. v. American Power Products, Inc.*, 228 F.3d 1365, 1377 (Fed. Cir. 2000). Under Ninth Circuit authority, judicial estoppel is invoked "not only to prevent a party from gaining an advantage by taking inconsistent positions, but also because of general considerations of the orderly administration of justice and regard for the dignity of judicial proceedings, and to protect against a litigant playing fast and loose with the courts." *See Hamilton v. State Farm Fire & Casualty Co.*, 270 F.3d 778, 782 (9th Cir. 2001) (internal quotation and citation omitted). Judicial estoppel is to be applied only in instances of "knowing misrepresentation to or . . . fraud on the court." *See Johnson v. Oregon Dep't of Human Res., Rehab. Div.*, 141 F.3d 1361, 1369 (9th Cir. 1998). "If incompatible positions are based not on chicanery, but only on inadvertence or mistake, judicial estoppel does not apply." *Id.*

1. Application to Statements to PTO

Magma raises a question as to whether judicial estoppel is applicable where the prior statements have been made to the PTO rather than a court. The Ninth Circuit has held, however, that although the doctrine of judicial estoppel "is often articulated as applying to 'judicial' proceedings," the doctrine is also applicable where "the prior

proceeding was administrative rather than judicial.” See Rissetto v. Plumbers and Steamfitters Local 343, 94 F.3d 597, 604 (9th Cir. 1996) (applying judicial estoppel where prior statement was made in workers’ compensation proceeding).¹¹ Moreover, the Federal Circuit, applying similar Seventh Circuit law, has discussed the doctrine of judicial estoppel in the context of a party’s prior inconsistent statements to the PTO, without expressing any concerns about the applicability of the doctrine to such statements. See Lampi, 228 F.3d at 1377 (stating “we are troubled by the inconsistencies between [plaintiff’s] statements to the PTO . . . and the position taken by [plaintiff] in this litigation,” but ultimately affirming decision not to apply judicial estoppel where district court found inconsistencies were inadvertent).

Accordingly, the Court finds the doctrine of judicial estoppel is applicable to cases in which the prior statements at issue were made to the PTO.

2. New Hampshire v. Maine Factors

The Court next turns to the New Hampshire v. Maine factors and, for the reasons set forth below, finds the doctrine of judicial estoppel is not applicable herein.

With respect to the first factor, it cannot be disputed that Magma’s statements to the PTO are inconsistent with its position in the instant litigation; Magma repeatedly represented to the PTO that van Ginneken was the sole inventor of the inventions claimed in the ’446 and ’438 patents, while in the instant litigation Magma contends that van Ginneken and Kudva were co-inventors thereof. With respect to the second factor, it cannot be disputed that Magma was successful in obtaining acceptance of its former position, in that it obtained issuance of the ’446 and ’438 patents as a result of its assertion

¹¹ The Court has not considered Magma’s citation to Devon Industries, Inc. v. American Medical Int’l. Inc., 65 F.3d 910 (9th Cir. 1995), an unpublished Ninth Circuit decision. “Unpublished dispositions and orders” of the Ninth Circuit “are not binding precedent,” and “may not be cited to or by the courts of [the Ninth] [C]ircuit,” except in circumstances not applicable here. See 9th Cir. R. 36-3. Newly-adopted Federal Rule of Appellate Procedure 32.1 is inapplicable to unpublished decisions issued prior to January 1, 2007. In any event, Devon predates Rissetto, and, consequently, its finding that judicial estoppel is limited to judicial proceedings is contrary to binding precedent.

1 that van Ginneken was the sole inventor.¹²

2 With respect to the third factor, however, Synopsys has not shown that Magma
3 would "derive an unfair advantage or impose an unfair detriment on [Synopsys] if not
4 estopped." See New Hampshire v. Maine, 532 U.S. at 751. Judicial estoppel "precludes a
5 party from gaining an advantage by taking one position, and then seeking a second
6 advantage by taking an incompatible position." See Rissetto, 94 F.3d at 600 (applying
7 judicial estoppel where plaintiff therein obtained workers' compensation benefits based on
8 inability to work, then sued employer for age discrimination and argued she was able to
9 perform her job). Magma, by contrast, has abandoned its prior claim that it owns the '446
10 and '438 patents, and has not disputed Synopsys's contention that all of van Ginneken's
11 inventive acts with respect to the '446 and '438 patents occurred during the time van
12 Ginneken was employed at Synopsys. Consequently, Magma is not seeking to obtain a
13 "second advantage" as a result of its current position; rather, it is giving up the advantage it
14 obtained as a result of its prior position.

15 Moreover, Magma, by doing so, is not imposing an "unfair detriment" on Synopsys.
16 Magma's abandonment of any claim of ownership in the '446 and '438 patents works to the
17 benefit of Synopsys. Although Magma also contends Kudva is a co-inventor, such
18 contention imposes no "unfair" detriment on Synopsys, as Synopsys is not entitled to sole
19 ownership where Kudva in fact is a co-inventor.

20 Under the circumstances of the instant case, the Court finds Magma's change in
21 position with respect to inventorship poses no "threat to judicial integrity," see id. at 750,
22 and that neither the New Hampshire v. Maine factors nor any other factors weigh in favor of
23 application of judicial estoppel. Accordingly, the Court finds Magma is not judicially
24
25
26

27 ¹² With respect to the continuation applications, no patents have issued thereon;
28 consequently, Magma has not obtained a benefit as a result of its representations as to
sole inventorship in connection with those applications.

1 estopped from asserting that Kudva is a co-inventor of the '446 and '438 patents.¹³

2 **D. CONCEPTION**

3 Magma argues that IBM is a co-owner of the '446 and '438 patents because van
4 Ginneken and Kudva jointly conceived, and, thus, were co-inventors of, the inventions set
5 forth therein.¹⁴

6 Under patent law, joint conception occurs where "each inventor . . . contribute[s] to
7 the joint arrival at a definite and permanent idea of the invention as it will be used in
8 practice." See Burroughs Wellcome, 40 F.3d at 1229; see also id. at 1228 (defining
9 "conception" as "the formation in the mind of the inventor, of a definite and permanent idea
10 of the complete and operative invention, as it is hereafter to be applied in practice")
11 (internal quotation and citation omitted). "An idea is definite and permanent when the
12 inventor has a specific, settled idea, a particular solution to the problem at hand, not just a
13 general goal or research plan he hopes to pursue." Id. at 1228. "Conception is complete
14 only when the idea is so clearly defined in the inventor's mind that only ordinary skill would
15 be necessary to reduce the invention to practice, without extensive research or
16 experimentation." Id. "[A]n inventor need not know that his invention will work for
17 conception to be complete[.]" however. See id. "He need only show that he had the idea;
18 the discovery that an invention actually works is part of its reduction to practice." Id.

19 Persons may be "joint" inventors even though "(1) they did not physically work
20 together or at the same time, (2) each did not make the same type or amount of
21 contribution, or (3) each did not make a contribution to the subject matter of every claim of
22 the patent." See 35 U.S.C. § 116. By enacting the above-quoted language, "Congress
23 intended to clarify the law of joint inventorship by codifying the principles stated in
24 Monsanto [Co. v. Kamp, 269 F. Supp. 818 (D.D.C. 1967)]." See Kimberly-Clark Corp. v.

25
26 ¹³ In light of this ruling, the Court does not reach Magma's argument that Synopsys
27 is barred, under the doctrine of unclean hands, from asserting judicial estoppel against
Magma.

28 ¹⁴ Magma does not challenge the inventorship of the '114 patent.

1 Procter & Gamble Distributing Co., Inc., 973 F.2d 911, 916 (Fed. Cir. 1992). In Monsanto,
2 the court held that a “joint invention is the product of collaboration of the inventive
3 endeavors of two or more persons working toward the same end and producing an
4 invention by their aggregate efforts.” See Kimberly-Clark, 973 F.2d at 916 (quoting
5 Monsanto, 269 F. Supp. at 824) (emphases deleted).

6 “It is not necessary that the entire inventive concept should occur to each of the joint
7 inventors[.]” Id. (quoting Monsanto, 269 F. Supp. at 824). “The fact that each of the
8 inventors plays a different role and that the contribution of one may not be as great as that
9 of another does not detract from the fact that the invention is joint if each makes some
10 original contribution, though partial, to the final solution of the problem.” Id. (quoting
11 Monsanto, 269 F. Supp. at 824). For example, “[o]ne may do more of the experimental
12 work while the other makes suggestions from time to time.” See id. Indeed, there is “no
13 explicit lower limit on the quantum or quality of inventive contribution required for a person
14 to qualify as a joint inventor.” See Fina Oil & Chem. Co. v. Ewen, 123 F.3d 1466, 1473
15 (Fed. Cir. 1997). The law requires only that “an individual must make a contribution to the
16 conception of the claimed invention that is not insignificant in quality, when that contribution
17 is measured against the dimension of the full invention.” See id.

18 The requisite contribution may be the identification of other work, for example, “one
19 inventor seeing a relevant report and building upon it.” See Kimberly-Clark, 973 F.2d at
20 917. On the other hand, “a person will not be a co-inventor if he or she does no more than
21 explain to the real inventors concepts that are well known and the current state of the art.”
22 See Fina Oil, 123 F.3d at 1473.

23 “Because co-inventors need not make a contribution to the subject matter of every
24 claim of the patent, inventorship is determined on a claim-by-claim basis.” See Trovan, Ltd.
25 v. Sokyumat SA, Irori, 299 F.3d 1292, 1302 (Fed. Cir. 2002) (internal quotation and citation
26 omitted). A “contribution to one claim is enough” to establish joint inventorship for the
27 entire patent. See Ethicon, 135 F.3d at 1460. Thus, “an inventorship analysis, like an
28 infringement or invalidity analysis, begins as a first step with a construction of each

1 asserted claim to determine the subject matter encompassed thereby." See Trovan, 299
2 F.3d at 1302. "The second step is then to compare the alleged contributions of each
3 asserted co-inventor with the subject matter of the properly construed claim[.]" Id.

4 **1. Joint Conception of Inventions Set Forth in '446 and '438 Patents**
5 **Based on Kudva's Contribution of Methods for Setting and**
6 **Calculating Delays in Size-Independent Manner**

7 Each claim of the '446 and '438 Patents requires that cells have an "initial intended
8 delay" or an associated "relative delay value," both of which terms, as noted, have been
9 construed by the Court as a "delay set as a target." (See Docket No. 392 at 32:7, 32:13.)
10 The Court's construction requires the target delay to be held constant unless it is revised at
11 some point in the design process. (See id. at 10:1-25.) Accordingly, conception of the
12 "complete and operative invention, as it is hereafter to be applied in practice," see
13 Burroughs Wellcome, 40 F.3d at 1228, requires a method to set the target delay and
14 thereafter to calculate changes to the delay caused by changes in the load, which, in turn,
15 will be accommodated by adjustments in cell size to maintain the target delay. Before
16 collaborating with Kudva, van Ginneken did not have a method for setting target delays for
17 arbitrary cells and measuring changes in delay resulting from changes in load. Kudva's
18 contribution of Sutherland's theory of logical effort and a gain-based model for setting and
19 measuring delays provided this method.

20 Before collaborating with Kudva, van Ginneken possessed merely a "philosophy,"
21 (see Ex. 1152), and had not arrived at a definite and permanent idea of the invention as it
22 would be used in practice. Such "philosophy" falls short of the standard for conception.
23 "The conception analysis necessarily turns on the inventor's ability to describe his invention
24 with particularity." Burroughs Wellcome, 40 F.3d at 1228. "Until he can do so, he cannot
25 prove possession of the complete mental picture of the invention." Id.

26 As set forth in the Court's findings of fact, the operative methods for setting and
27 measuring delays arose out of van Ginneken's joint work with Kudva from early March
28 1996 until the May 1996 completion of the White Paper. At the time Kudva and van
Ginneken began collaborating, van Ginneken was looking for a way to assign and model

1 delays. Kudva offered the theory of logical effort and explained how it provided an
2 operative method for assigning the delays in a size-independent fashion. Contrary to
3 Synopsys's argument, Kudva did more than merely contribute "concepts that are well
4 known and the current state of the art," see Fina Oil, 123 F.3d at 1473. Rather, as noted,
5 Kudva recognized that the theory of logical effort, as set forth in the Sutherland paper,
6 could be applied to the theory of constant delay and introduced van Ginneken to the idea of
7 using gain to assign initial delays. As the Federal Circuit has observed, "[t]he genius of
8 invention is often a combination of known elements which in hindsight seems ordained."
9 See McGinley v. Franklin Sports, Inc., 262 F.3d 1339, 1351 (Fed. Cir. 2001).

10 As further noted, Van Ginneken and Kudva jointly authored the White Paper, which
11 applies the theory of logical effort as a size-independent method for setting target delays
12 and measuring delays for arbitrary cells. (See Ex. 1163.) The White Paper provides the
13 first complete description of the inventions claimed in the '446 and '438 patents. (See id.)
14 Indeed, it was the White Paper that described those inventions, for the first time, with the
15 "particularity" required to satisfy the test for conception. See Burroughs Wellcome, 40 F.3d
16 at 1228. As the White Paper demonstrates, the theory of logical effort provided the
17 "particular solution" that enabled van Ginneken and Kudva to solve the "problem at hand."
18 See Burroughs Wellcome, 40 F.3d at 1228; see also Tr. 1175:13-1177:22 (Sarrafzadeh).
19 The collaboration between van Ginneken and Kudva resulted in "the joint arrival at a
20 definite and permanent idea of the invention as it will be used in practice." See Burroughs
21 Wellcome, 40 F.3d at 1229-30.

22 The evidence that Kudva provided the theory of logical effort and a gain-based
23 model for setting and measuring delays demonstrates, not only by a preponderance of the
24 evidence, but also by clear and convincing evidence, that Kudva is a joint inventor with van
25 Ginneken with respect to all of the claims of the '446 and '438 Patents.

26 **2. Joint Ownership of '446 and '438 Patents by IBM and Synopsys as**
27 **Result of Kudva and van Ginneken's Joint Conception of**
28 **Inventions Claimed therein**

"[I]n the context of joint inventorship, each co-inventor presumptively owns a pro rata

1 undivided interest in the entire patent, no matter what their respective contributions.”
2 Ethicon, 135 F.3d at 1465. Such presumption of co-ownership may be rebutted, however,
3 by proof that an inventor’s ownership interests were assigned to another party. See, e.g.,
4 Teets v. Chromalloy Gas Turbine Corp., 83 F.3d 403, 407 (Fed. Cir. 1996). Consequently,
5 Kudva and van Ginneken, as co-inventors of the ‘446 and ‘438 Patents, are presumed to
6 be co-owners of those patents, in the absence of any evidence that they assigned those
7 interests.

8 Here, as noted, Kudva assigned to IBM all inventions he conceived in connection
9 with his employment, (see Ex. 1121), and van Ginneken assigned to Synopsys all
10 inventions he conceived in connection with his employment, (see Ex. 98). Magma has
11 neither argued nor submitted evidence that van Ginneken conceived of any of the
12 inventions set forth in the ‘446 or ‘438 patents during the time he worked at Magma, or that
13 any other Magma employee participated in the conception of the inventions set forth in the
14 ‘446 and ‘438 patents.

15 Accordingly, the Court finds IBM and Synopsys are co-owners of the ‘446 and ‘438
16 Patents as a result of Kudva’s and van Ginneken’s joint conception of the inventions
17 claimed therein.

18 **E. REDUCTION TO PRACTICE**

19 Although, as set forth above, Magma has established that IBM and Synopsys are
20 co-owners of the ‘446 and ‘438 patents, based on joint conception by Kudva and van
21 Ginneken, the Court will address Magma’s additional argument that IBM and Synopsys are
22 co-owners of the ‘446 and ‘438 patents, as well as the ‘114 patent, because IBM and
23 Synopsys jointly reduced to practice the inventions set forth therein.

24 Under the JDA, a party is entitled to joint ownership of “any discovery or
25 improvement, conceived or first reduced to practice by one or more employees of one party
26 jointly with one or more employees of the other party.” (See Ex. 1120 § 1.25 (emphasis
27 added).)

28 Under patent law, “[a] reduction to practice can be either a constructive reduction to

1 practice, which occurs when a patent application is filed, or an actual reduction to practice.”
2 See Cooper v. Goldfarb, 154 F.3d 1321, 1327 (Fed. Cir. 1998). There is no evidence that
3 Synopsys and IBM intended that one party unilaterally could obtain sole ownership rights in
4 an invention the parties were jointly working to reduce to practice, merely by unilaterally
5 filing a patent application prior to actual reduction to practice. Accordingly, the Court finds
6 joint reduction to practice, within the meaning of the JDA, does not include the concept of
7 constructive reduction to practice.

8 To prove actual reduction to practice, a party must show that the inventor
9 (1) “constructed an embodiment or performed a process that met all the limitations of the
10 claim,” and (2) “determined that the invention would work for its intended purpose.” See
11 Slip Track Systems, Inc. v. Metal-Lite, Inc., 304 F.3d 1256, 1265 (Fed. Cir. 2002). The first
12 part of the test is similar to the test for infringement. See, e.g., Research Plastics, Inc. v.
13 Federal Packaging Corp., 421 F.3d 1290, 1297 (Fed. Cir. 2005) (“Literal infringement
14 requires that the accused device embody each limitation of the asserted claim. The
15 absence of any limitation of the asserted claim defeats literal infringement”); Eaton v.
16 Evans, 204 F.3d 1094, 1097 (Fed. Cir. 2000) (“[T]here can be no actual reduction to
17 practice if the constructed embodiment or performed process lacks an element recited in
18 the [claim] or uses an equivalent of that element.”). “[T]ypically expert testimony will be
19 necessary in cases involving complex technology.” See Centricut, LLC v. The Esab
20 Group, Inc., 390 F.3d 1361, 1370 (Fed. Cir. 2005) (discussing infringement).

21 With respect to the second part of the above-referenced test, the intended purpose
22 of the invention ordinarily will be determined by reference to the language of the claim.
23 See, e.g., Griffin v. Bertina, 285 F.3d 1029, 1033-34 (Fed. Cir. 2002); Manning v. Paradis,
24 296 F.3d 1098, 1102 (Fed. Cir. 2002). A determination that the invention would work for
25 that purpose, however, does “not require that the invention, when tested, be in a
26 commercially satisfactory stage of development.” See Scott v. Finney, 34 F.3d 1058, 1061
27 (Fed. Cir. 1994) (internal quotation and citation omitted). Rather, reduction to practice
28 requires “only a reasonable showing that the invention will work to overcome the problem it

addresses.” See id. at 1063. “The adequacy of a reduction to practice is to be tested by what one of ordinary skill in the art would conclude from the results of the tests.” See Slip Track, 304 F.3d at 1265 (internal quotation and citation omitted). “Testing need not show utility beyond a possibility of failure, but only utility beyond a probability of failure.” Scott, 34 F.3d at 1062.

The inventor must “contemporaneously appreciate that the embodiment worked,” however, and that it “met all the limitations” of the claim. See Cooper, 154 F.3d at 1327. “[R]eduction to practice does not occur until an inventor, or perhaps his agent, knows that the invention will work for its intended purpose.” See Estee Lauder v. L’Oreal, S.A., 129 F.3d 588, 593 (Fed. Cir. 1997). Moreover, “a party cannot obviate the initial requirement that a constructed embodiment include every element of the [claim] through evidence that the embodiment worked for its intended purpose, regardless of the quality of the evidence.” See Eaton, 204 F.3d at 1098.

1. Claim Limitations

Magma’s arguments in support of joint reduction to practice rely entirely on the creation and testing of Synzilla.¹⁵ Although Magma presented no expert testimony that, when the testing of Synzilla was conducted, Synzilla met the limitations of any of the patents’ claims, Magma argues it had no need to present such evidence because Synopsys admitted, in the Rule 30(b)(6) deposition of Damiano, that Synzilla met the limitations of all of the claims of each of the three patents.

At that deposition, Damiano, Synopsys’s Rule 30(b)(6) designee on the subject of Synzilla, (see Tr. 812:12-18 (Damiano)), testified that he “believe[d]” Synzilla “practiced” claim 1 of the ’446 patent, using the term “practice” to mean Synzilla satisfied all the limitations of that claim. (See Damiano Dep. 247:2-249:21; see also Tr. 792:4-12

¹⁵ Magma has admitted in responses to requests for admission that the inventions were not reduced to practice before van Ginneken resigned from Synopsys. Those responses preclude Magma from contending that the inventions were jointly reduced to practice by Synopsys and IBM before van Ginneken resigned from Synopsys. See Fed. R. Civ. P. 36(b); see also Amended Order Denying Motions for Summary Judgment re: Patent Ownership, filed March 30, 2006, at 17.

1 (Damiano).) Damiano further testified that Synzilla "practiced" claim 1 of the '438 patent.
2 (See Damiano Dep. 249:22-250:14.)

3 Contrary to Magma's argument, testimony by a Rule 30(b)(6) designee is not a
4 binding admission on the designating corporation, but, rather, is "evidence which, like any
5 other deposition testimony, can be contradicted." See A.I. Credit Corp. v. Legion Ins. Co.,
6 265 F.3d 630, 637 (7th Cir. 2001). Here, however, Synopsys submits no evidence
7 contradicting Damiano's admissions, but, rather, argues only that Magma has failed to
8 meet its burden of proof. Because Damiano, Synopsys's Rule 30(b)(6) designee, admitted
9 that Synzilla practiced claim 1 of the '446 patent and claim 1 of the '438 patent, and the
10 admission is uncontradicted, the Court finds Magma has satisfied its burden of
11 demonstrating that Synzilla met all the limitations of those claims.

12 With respect to the '114 patent, however, Magma points to no similar statement by
13 Damiano, and has cited no other evidence to that effect. Accordingly, the Court finds
14 Magma has not demonstrated that Synzilla met the limitations of any claim of the '114
15 patent.¹⁶

16 2. Contemporaneous Appreciation

17 The parties dispute the precise intended purposes of the inventions set forth in the
18 patents. The Court need not decide the issue, however, because regardless of the intended
19 purposes of the inventions, and even assuming, arguendo, Synzilla in fact worked for such
20 purposes, the evidence clearly demonstrates there was no contemporaneous appreciation
21 that any intended purpose had been achieved. See Cooper, 154 F.3d at 1327; see also
22 Estee Lauder, 129 F.3d at 593. Shenoy described the Synzilla test results as "extremely
23 frustrating" and "very, very disappointing," to the point that Synopsys "gave up on the gain-
24 based sizing." (See Tr. 947:19-24, 952:23-953:8 (Shenoy).) Intel's Randy O'Hara similarly
25 testified that the test results did not meet Intel's expectations and that Intel decided not to
26 "move forward" with Synzilla. (See O'Hara Dep. 80:7-81:8.) Magma has pointed to no

27
28 ¹⁶ For this reason alone, Magma's argument that Synopsys and IBM jointly reduced to practice the inventions set forth in the '114 patent fails.

1 evidence suggesting that IBM was of a different opinion.

2 Accordingly, as Magma has not demonstrated that Synopsys and IBM had a
3 contemporaneous appreciation that the inventions incorporated into Synzilla worked for
4 their intended purposes, Magma has failed to establish reduction to practice, much less
5 joint reduction to practice, of the inventions set forth in the '446, '438, and '114 patents.

6 **F. APPLICATION OF RICHARDSON v. SUZUKI**

7 The Court rejects Synopsys's argument that Richardson v. Suzuki Motor Co., Ltd.,
8 868 F.2d 1226 (Fed. Cir. 1989) requires assignment of the '446 and '438 patents only to
9 Synopsys regardless of any interest IBM may have in those patents. In Richardson, a jury
10 found the defendant, Suzuki, fraudulently obtained a patent ("the Tamaki patent") on an
11 invention misappropriated from the inventors, specifically, plaintiff Richardson and non-
12 party Cazort. See id. at 1249. The district court, on the ground that Richardson was not
13 the sole inventor, denied Richardson's post-trial motion to reassign the Tamaki patent to
14 Richardson. See id. The Federal Circuit reversed, stating that "[t]o hold otherwise would
15 ratify and indeed reward the wrongdoing," and that "[b]ased on the jury verdict, Richardson
16 [was] entitled to ownership of the patents as against Suzuki." See id. Consequently, even
17 though Cazort was a co-inventor of the patents, the Federal Circuit ordered reassignment
18 of the patents to Richardson. See id.

19 Richardson does not bar assignment from Magma to both Synopsys and IBM.
20 Richardson never addressed the question of whether an assignment could have been
21 made to both Richardson and Cazort, had the district court been asked to do so and an
22 adequate record of joint ownership been made.¹⁷ Moreover, Magma, unlike Suzuki, is not
23 claiming an interest in the patents. Accordingly, even if Magma initially engaged in
24 wrongdoing, an issue this Court has not reached, assigning the patents to both Synopsys
25 and IBM will not "ratify and . . . reward [that] wrongdoing," but rather will ensure that the
26 patents are restored to the proper owners.

27
28 ¹⁷ The jury apparently found Richardson and Cazort were joint inventors, but made
no finding as to joint ownership. See id.

1 **G. CONTINUATION PATENT APPLICATIONS AND FOREIGN PATENT**
 2 **APPLICATIONS**

3 Although the parties stipulated that the trial would determine the issue of ownership
 4 of the continuation patent applications and foreign patent applications, (see Docket 986
 5 at 2), the parties have spent little time discussing those applications in their post-trial
 6 briefs.¹⁸ Three continuation applications have been identified. On April 19, 2004, Magma
 7 filed United States Patent Application No. 10/828,547, which is a continuation of, inter alia,
 8 the applications that issued as the '446 and '438 patents. (See Ex. 20.) The application
 9 lists van Ginneken as the sole inventor of the claimed inventions. (See id., last page.) On
 10 October 6, 2005, Magma filed two additional patent applications, United States Patent
 11 Applications Nos. 11/245,530 and 11/246,451, both of which applications are continuations
 12 of, inter alia, the applications that issued as the '438 and '446 patents. (See Exs. 77 and
 13 78.) Magma also filed, in foreign patent offices, the following patent applications for van
 14 Ginneken's asserted inventions: Japan Patent Application No. JP20000526885T, Israel
 15 Patent Application No. IL136709D, Canada Patent Application No. CA2317538, European
 16 Patent Application No. EP1040435, and International Patent Application No. WO9934310.
 17 (See van Ginneken Dep. 315:11-316:2; see Exs. 14-17, 125.)

18 As a matter of law, "a 'continuation' application claims the same invention claimed in
 19 an earlier application, although there may be some variation in the scope of the subject
 20 matter claimed." See Transco Products Inc. v. Performance Contracting Inc., 38 F.3d 551,
 21 555 (Fed. Cir. 1994); see also John Gladstone Mills III et al., 3 Patent Law Fundamentals §
 22 15.8 (2006) ("The disclosure contained in the continuation must be the same as that of the
 23 original application, that is, the continuation should not include anything which would
 24 constitute new matter if inserted in the original application."). Because all three of the
 25 continuation applications are based on the applications that issued as the '446 and '438
 26 patents, and the Court has determined that Synopsys and IBM are co-owners of the '446

27 ¹⁸ Magma presented no argument with respect to the above-referenced patent
 28 applications in its post-trial briefing; Synopsys's argument on the issue consists of one
 paragraph.

1 and '438 patents by reason of van Ginneken's and Kudva's co-invention of the inventions
 2 claimed therein, and as neither party contends that the ownership of the continuation
 3 applications should differ from that of the '446 and '438 patents,¹⁹ the Court finds Synopsys
 4 and IBM are co-owners of the continuation applications.

5 With respect to the foreign patent applications, neither party has submitted any
 6 evidence as to their ownership. In its initial post-trial memorandum, however, Synopsys
 7 states that "Magma's foreign counterpart applications contain the same inventions as the
 8 '446 and '438 patents." (See Synopsys's Post-Trial Brief at 39 n.3.) Magma, in its post-
 9 trial memoranda, does not take issue with this statement. Accordingly, as the Court has
 10 determined that Synopsys and IBM are co-owners of the '446 and '438 patents, and as
 11 neither party contends ownership of the foreign patent applications differs from that of the
 12 '446 and '438 patents, the Court finds Synopsys and IBM are co-owners of the foreign
 13 patent applications as well.

14 CONCLUSION

15 For the reasons set forth above, the Court finds:

- 16 1. Synopsys and IBM are co-owners of the '446 patent.
- 17 2. Synopsys and IBM are co-owners of the '438 patent.
- 18 3. Synopsys is the sole owner of the '114 patent.
- 19 4. Synopsys and IBM are co-owners of the following continuation applications:

20 United States Patent Applications Nos. 10/828,547, 11/245,530 and 11/246,451.

- 21 5. Synopsys and IBM are co-owners of the following foreign patent applications:

22 Japan Patent Application No. JP20000526885T, Israel Patent Application No. IL136709D,
 23 Canada Patent Application No. CA2317538, European Patent Application No. EP1040435,
 24 and International Patent Application No. WO9934310.

- 25 6. Magma shall take forthwith all necessary steps to transfer to Synopsys and IBM

26
 27 ¹⁹ The Court notes that each continuation application includes one or more claims
 28 requiring either "choosing a target delay," (see Ex. 77 at 21:3, Ex. 78 at 36:3), or using cells
 with "an associated relative delay value," (see Ex. 20 at 60:3-5.) As discussed above,
 Kudva contributed the method for selecting the desired delay associated with each cell.

1 United States Patent Applications Nos. 10/828,547, 11/245,530 and 11/246,451, Japan
2 Patent Application No. JP20000526885T, Israel Patent Application No. IL136709D, Canada
3 Patent Application No. CA2317538, European Patent Application No. EP1040435, and
4 International Patent Application No. WO9934310. As Magma, in connection with its
5 recently-filed motion to stay, has submitted evidence that it has transferred title to the '446
6 and '438 patents to Synopsys, in compliance with the Court's January 3, 2007 order
7 granting Synopsys's motion for preliminary injunction, Synopsys shall take all necessary
8 steps to add IBM as a joint owner of record.

9 Accordingly:

10 1. As to Magma's Second Counterclaim, by which Magma seeks a declaration that
11 IBM is a joint owner of the '114 patent, Synopsys is entitled to judgment.

12 2. As to Magma's Fourth Counterclaim, by which Magma seeks a declaration that
13 Magma is an owner, in whole or in part, of the '446 and '438 patents, Synopsys is entitled
14 to judgment.

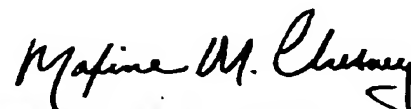
15 3. As to Magma's Sixth Counterclaim, by which Magma seeks a declaration that
16 IBM is a joint owner of the '446 patent, Magma is entitled to judgment.

17 4. As to Magma's Tenth Counterclaim, by which Magma seeks a declaration that
18 IBM is a joint owner of the '438 patent, Magma is entitled to judgment.

19 5. As to Magma's Seventh Affirmative Defense, by which Magma asserts that van
20 Ginneken did not assign the inventions set forth in the '446 and '438 patents to Synopsys
21 or, in the alternative, that only a partial interest in said patents was assigned to Synopsys
22 and that a partial interest in said patents also is held by Magma and/or IBM, Magma is
23 entitled to judgment to the extent Magma seeks a declaration that IBM and Synopsys are
24 joint owners of the '446 and '438 patents.

25 **IT IS SO ORDERED.**

26 Dated: January 31, 2007

27 
28 MAXINE M. CHESNEY
United States District Judge

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8 Attorneys for Plaintiff and Counter-Defendant,
9 SYNOPSIS, INC.

10 UNITED STATES DISTRICT COURT
11 NORTHERN DISTRICT OF CALIFORNIA
12 SAN FRANCISCO DIVISION

13 SYNOPSIS, INC., a Delaware
14 corporation,

15 Plaintiff and Counter-Defendant,

16 v.

17 MAGMA DESIGN AUTOMATION, a
18 Delaware corporation,

19 Defendant and Counter-Claimant.

20 AND RELATED COUNTER-CLAIMS.

Case No. C-04-03923 MMC (JCS)

**STIPULATION AND [PROPOSED] ORDER
RE: DISMISSAL [FRCP 41(a)(2)]**

21 WHEREAS, by agreement entered into between the parties on March 29, 2007, all claims
22 and counterclaims in the above referenced action have been fully resolved;

23 WHEREAS, by agreement of the parties, this Honorable Court is respectfully requested to
24 enter a dismissal with prejudice of the entire action, with each party to bear its own fees and costs
25 incurred. Provided, however, pursuant to Section N. 2 of the Protective Order (Docket 665), the
26 Protective Order and the obligations of the parties thereunder shall survive termination of this
27 action;

1 NOW, THEREFORE, based on the foregoing, the parties request entry of an order by this
2 Court as set forth herein.

3 Dated: March 30, 2007

DECHERT LLP

4
5 By: /s/Chris Scott Graham

Chris Scott Graham

6 Attorneys for Plaintiff and Counter-Defendant,
SYNOPSISYS, INC.

7 Dated: March 30, 2007

O'MELVENY & MYERS LLP

8
9 By: /s/George A. Riley

George A. Riley

10 Attorneys for Defendant and Counter-Claimant,
MAGMA DESIGN AUTOMATION, INC.

11 I declare under penalty of perjury that concurrence in the filing of this document has
12 been obtained from George A. Riley.

13 Dated: March 30, 2007

DECHERT LLP

14
15 By: /s/Chris Scott Graham

Chris Scott Graham

16 Attorneys for Plaintiff and Counter-Defendant,
SYNOPSISYS, INC.

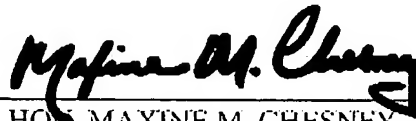
17
18 **ORDER**

19 PURSUANT TO STIPULATION, AND GOOD CAUSE SHOWN, IT IS HEREBY
20 ORDERED AS FOLLOWS:

21 1. Pursuant to FRCP 41(a)(2), this action is hereby dismissed with prejudice, with
22 each party to bear its own fees and costs.

23 2. The Protective Order (Docket 665) and the obligations of the parties thereunder
24 shall survive termination of this action.

25 DATED: April 16, 2007

26 

HON. MAXINE M. CHESNEY

UNITED STATES DISTRICT COURT JUDGE